# User’s Manual

# CALDsoft6

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## User's manual

This **User's Manual** serves as a guide to use the **CALDsoft Sheet Metal Unfolding Software** – allowing full calculation control and flat pattern management for a wide variety of pieces applied to Boiler and mechanical industry.

## IMPORTANT:

- **All dimensions for the pieces** displayed on the data entering screens must indicate outside measures.

- All bending lines must always remain on the outside of the pieces when folding them.

**Note: You may find in the Manual a few pieces not displayed on the CALDsoft program. Anyhow, those included herewith serve as illustration only without affecting the correct software understanding.**

## PREFACE:

Main advantages of the **CALDSOFT** system include how it was designed in order to perform precise calculations with the application of analytical mathematics concepts for the unfolding of sheet metal pieces, along with full extent control.

- **INSTALATION:**

Follow the instructions given below to install the CALDsoft program:

## 1° Step:

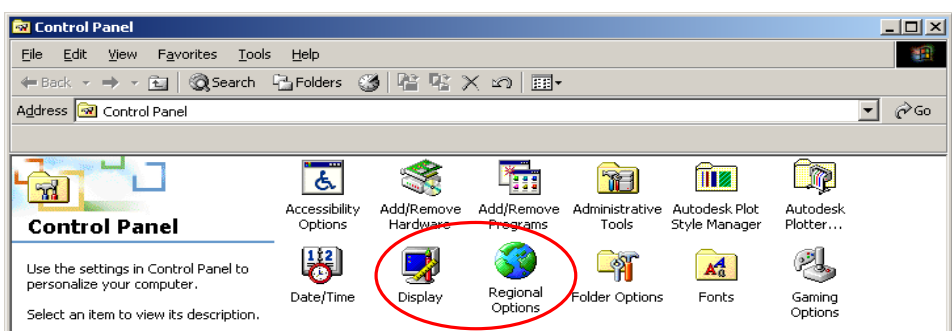
Introduce the CD into the CD-ROM drive.

Wait for the autorun. Choose the language, English or Portuguese, and install the CALDsoft6.

## 2° Step:

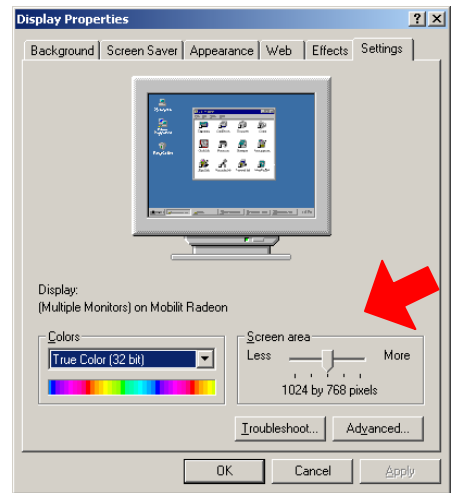
- Define the minimum video resolution of your computer in 800X600 pixels

Click on **Start / Settings / Control Panel button** and the following screen will be displayed:



Open the icon **Video** and, on the **Settings toolbar**, change the **Screen Area** option into a resolution of **800X600 pixels** or higher.

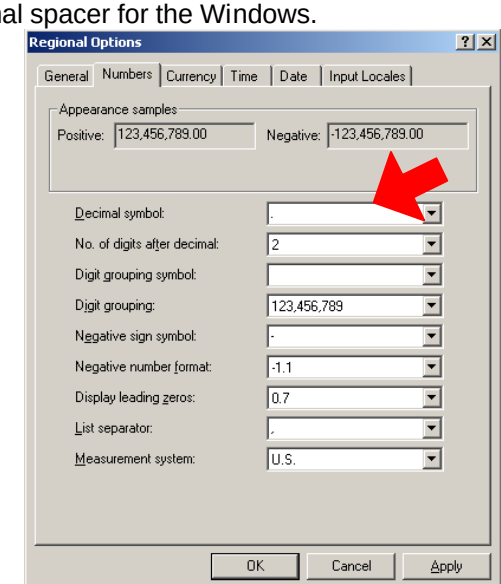
Then click on **Apply** and then on **OK.**




## 3° Step:

Now you must define the **dot ( . )** as the decimal spacer for the Windows.

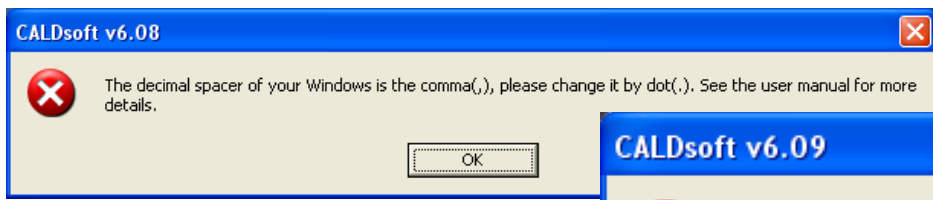
On the **Control Panel** window, open the **Regional Options** icon (one of the two icons shown on the previous page). On the **Numbers** toolbar, find the decimal symbol field and define **dot ( . )** as decimal spacer. While on the digit grouping symbol field, type comma ( , ) or leave it blank.
Then click on **Apply** and then on **OK.**

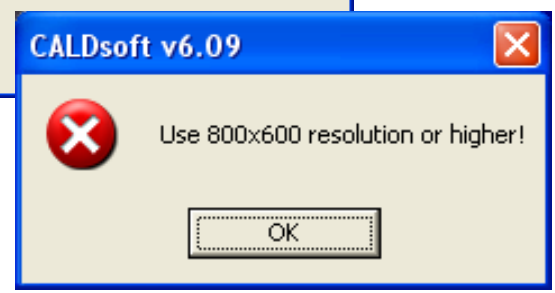


**IMPORTANT:**

Due to the software language used **(USA standard)**, you should not define **comma ( , )** as decimal spacer once the calculation will result in errors. So this item must be changed.

If such changes are not carried out accordingly, the following messages will be displayed on the screen when starting the **CALDsoft** program.


CALDsoft v6.08
The decimal spacer of your Windows is the comma(,), please change it by dot(.). See the user manual for more details.
OK




- ***Dongle***

Plug the dongle in your printing machine outlet, or into a computer USB border.

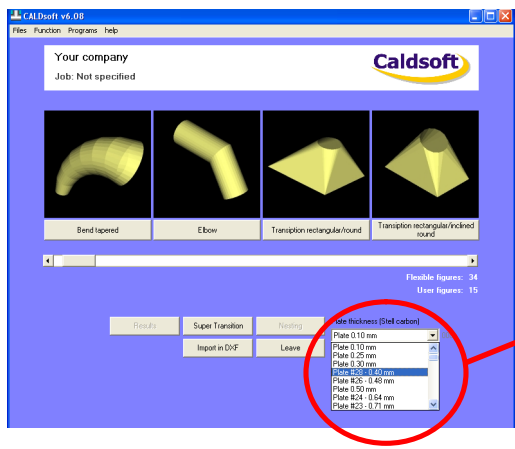
**IMPORTANT:**

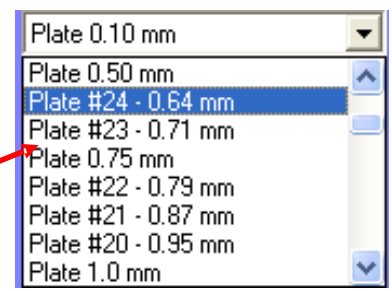
This KEY must be connected. Otherwise, the **CALDsoft** program will only run as demonstration option. Therefore, the KEY is the safety of your software avoiding reproduction of false copies. However, when installed on the outside of the equipment, it must be regarded as part of the computer.

- Read **Warranty Terms** supplied together with the system.

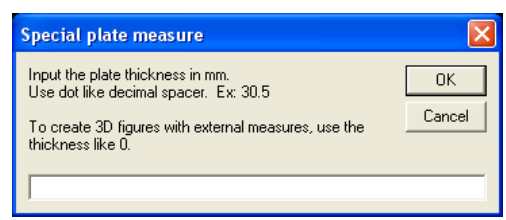
- **Defining steel plate thickness**

For the performance of a calculation, first define the steel plate thickness. This selection is done from a list that is available on the bottom right corner of the main screen. This list that includes all corresponding thickness, is based on the steel plates mostly commercialized, ranging from thickness 0.4mm (#28) up to 31.8mm as well as steel plates standardized in millimeters.



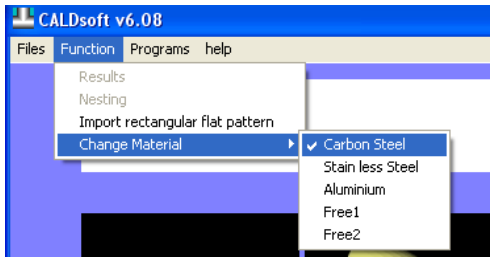

However, if the calculation requires another steel plate that is not included in the list, then indicate on the **Plate Thickness** field the option **<Other Thickness>.**

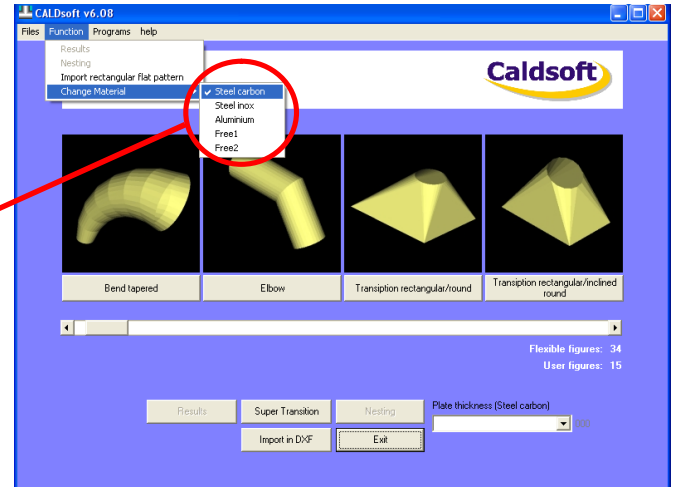

Special plate measure
Input the plate thickness in mm.
Use dot like decimal spacer. Ex: 30.5
To create 3D figures with external measures, use the thickness like 0.
OK
Cancel

- **Selecting steel plate material:**

To select a type of material, already showed previously, locate on the top toolbar of the main screen, on **Functions / Change Material** option, the required alternative.

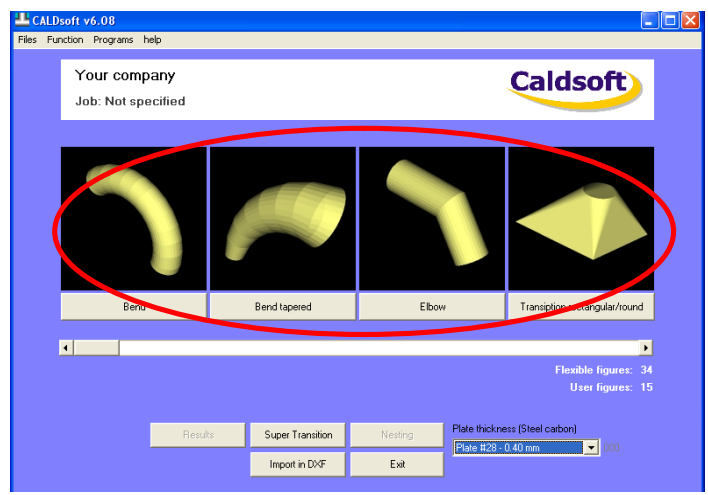
The required material is always represented with the symbol Ö and it is also indicated in parenthesis on the side of the **Plate Thickness** option on the main screen.




Five types of materials will be available, reminding that the first material in the list will be on the default (if the material to be used is not specified, that is, the one selected).

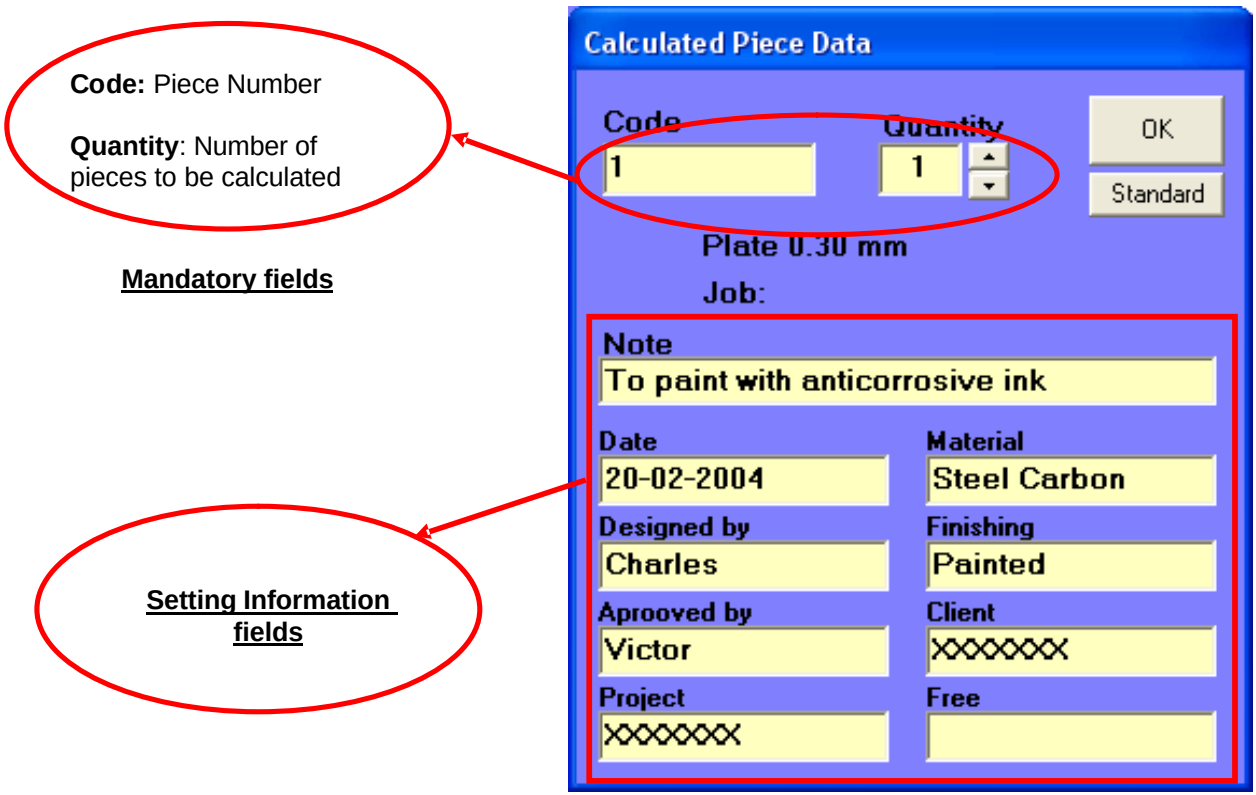
**Note: Notice that there are two free materials. The program already offers three standards. However, all of them can be changed by the user. This part will be described under the chapter "Setting CALDsoft".**




- **<u>Defining piece type:</u>**

To define the piece type to be used, you just need to click on the respective button of the piece on the main screen or click on the piece itself.

For the calculation of a piece, we will use as a sample the **<u>"Elbow"</u>** figure. After clicking on the figure button, the **"Calculated Piece Data"** will be displayed on the screen. On this screen you must fill in the mandatory fields and, if you wish, you may fill in the setting information fields.




After filling in all mandatory fields, you may fill in the optional fields with the piece information or click on the **Standard** button that will fill in the fields with the user's standard. This part will be described ahead under "Setting CALDsoft".

After that, click on OK button. Then you will have a screen where you can type the piece values. The drawing already specifies each blank, when complete, you just need to click on "Calculate" button.

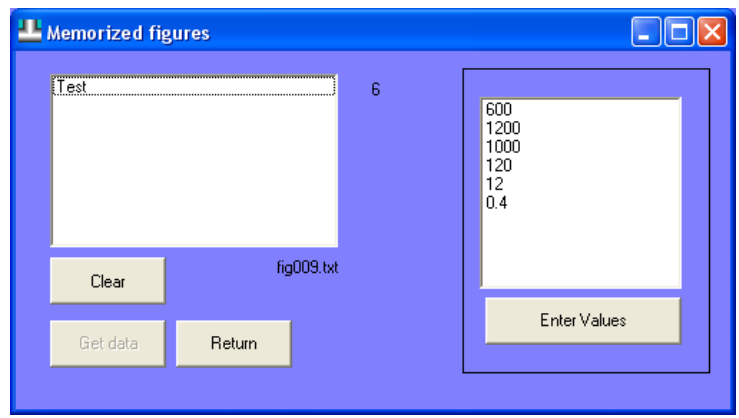
§ **Saving piece entering data**

If you wish to save the piece selected data, then click on the button of the right corner of the calculation screen.

After that, the data entering screen will open allowing you to record automatically the piece entering data by clicking on “Enter Values” and then type on the name you wish to give to this information.

Once you have some values already entered, you may get the data from the record by clicking on the same button that you clicked on to open the entering option, selecting the file and then clicking on “Get Data” button

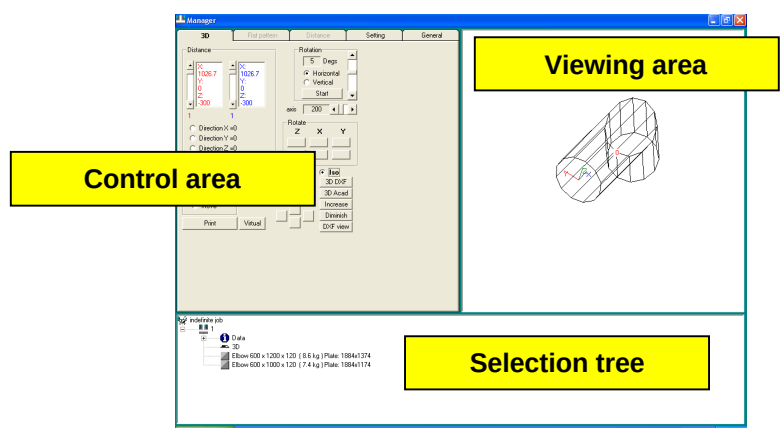
To clear any data from the previous record, you must click on **“Clear”** button and then select the field you wish to clear.




**REGISTERING SCREEN**

## Checking results:

Once the calculation is complete, click on “Results” button and the Manager will open.



On the button part of the screen there is a tree with “Data”, “3D” options and the flat patterns.
Clicking on “Data” icon, the calculated piece data will be displayed on the Viewing Area such as dimensions, steel plate thickness, weight, etc.

§ **3D interface:**

On the 3D toolbar, a 3D option piece will be displayed on the Control Area, you will have horizontal options (the piece rotates horizontally), vertical options (the piece will rotate vertically) and stop option (to stop the viewing and open a new screen of options).

On the new options screen there will be:

§ **Distance:** You will view the distance between two points on the piece (distance X, Y, Z, 3D); the two points may be dotted by scrolling the toolbar. If you click on one of the options below the red and blue squares, you can view on the piece the representation of a distance between the selected points.

§ **Left Button:** It represents the left button function of the mouse. Clicking with the mouse on the piece (always moving horizontally or vertically), the selected option (rotate or move the piece) will be performed. Clicking the mouse with the left button on the piece and you will control the piece zoom (if upwards, it magnifies the zoom; if downwards, it reduces it).

§ **Rotate:** It rotates the piece around Z, X and Y

§ **XZ, XY**, **YZ** and **Iso**: They define the 3D interface viewing options.

The other buttons have the same functions that the mouse performs on the **“Left Button”** option.

The “Virtual Motion” button shows a simplified piece animation in 3D option.

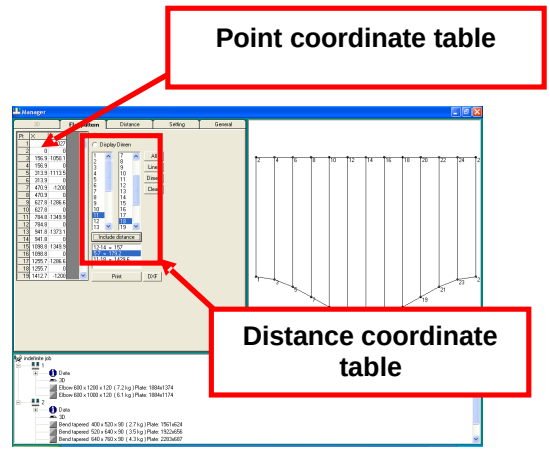
The “Printing” button prints the piece on the position and size that was left on the Viewing Area. This part will be described on the “Printing and creating a paper format” chapter.

The “3D Acad” button creates a file with 3D interfaces to be imported at a later stage by the Autocad. We will describe ahead how to import a piece from CALDsoft6 onto CAD system in the chapter “Exporting onto AutoCAD”.

- **Flat Pattern Toolbar:**

This is the most important toolbar once all flat patterns will be viewed and printed out on it. To allow this toolbar operate, you need to click on the flat pattern that you wish to view on the selection tree.

There are two ways to print out the flat pattern: through the distance between two points (Display points) and through dimensions (Display dimen).

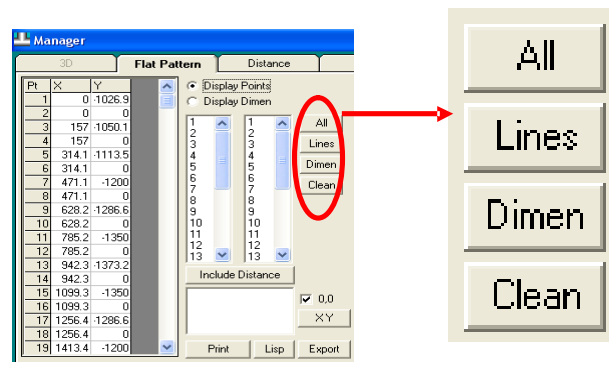



§ **Flat Patterns through points**:

Click on one of the points at the point coordinate table, you will view this point on the Viewing Area.

Selecting a point:

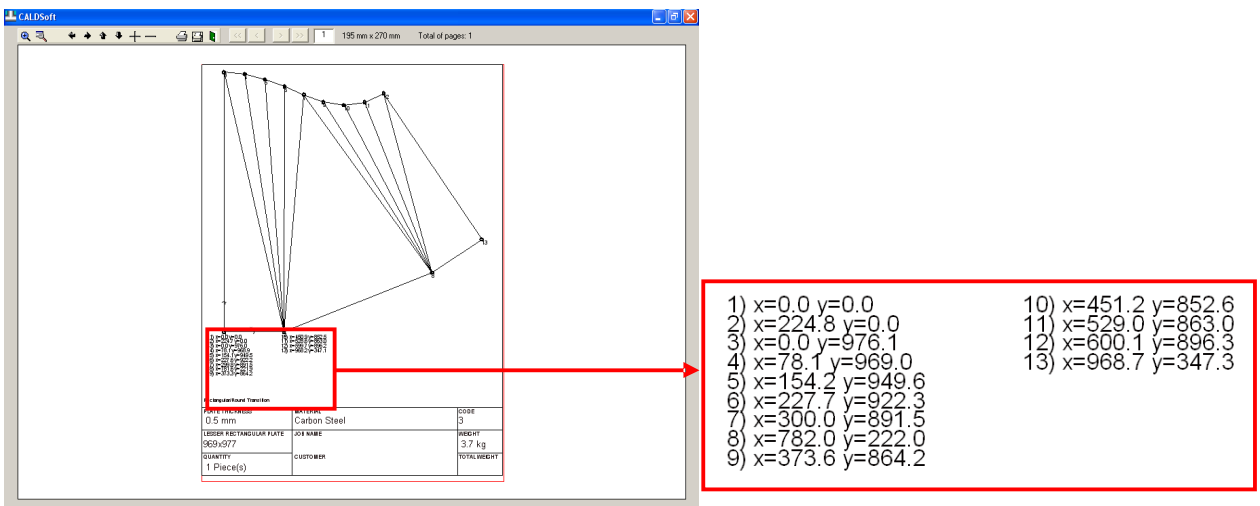
To select a distance, select one of the points of the first table and then select one of the points of the second table. Then click on the “Include distance” option. The distance will be included and it will be displayed on the printing table (white chart right below the “Include distance” button.
As an example, we will use the distance between points 2 and 5.



To select all distances among the points (for printing) click on “All”, to select all distances among points that has lines click on “Lines” and to select the distances among all of points that have dimension click on “Dimen”. To clean the distances square click on “Clean”, to erase a distance already included on printing square click twice on the distance chose and cofirm the operation. To print just click on “Print” button.

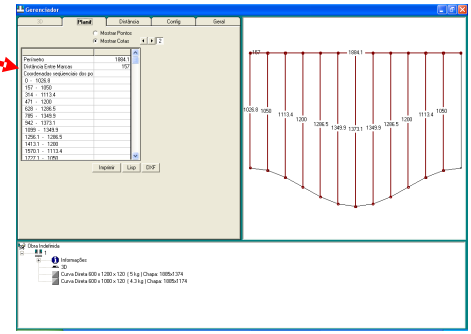
- **Printing for X and Y Coordinates**

On the same option of printing for points has a “XY” button. If you click on the button "XY" you will go to print the coordinates of the flat pattern. This is another method of designing which you can use the point coordinates of the flat pattern. In above "XY" button  exists the "0,0" checkbox that indicates if you want that appears, or not, the point 0,0 (in X and Y) in the printing page. When you click the "XY" button the printing screen will open with the flat pattern in the top and the coordinates down (like the figure below).



§ **Printing for dimension:**

Information Table

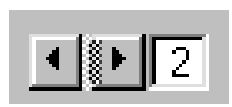


Note: depending of kind of calculate unfolding the information table will have differents kind of datas.

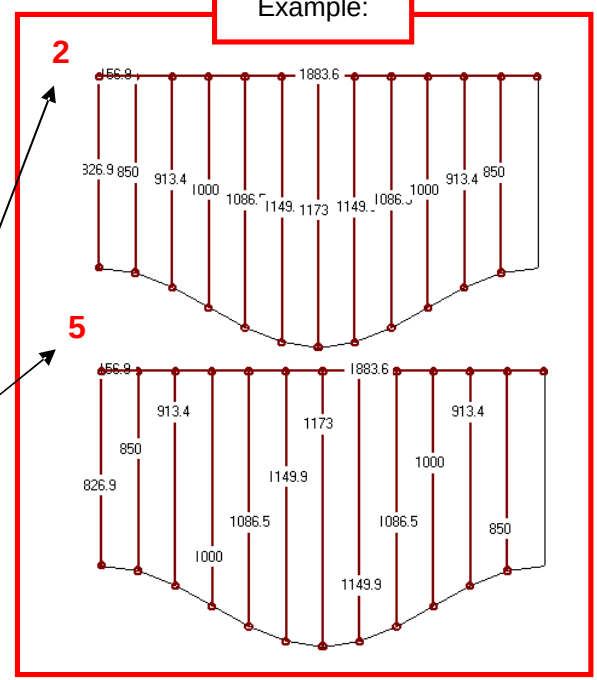
For example to elbow, clicking on “Display Dimen” will be showed, the perimeter, the distance between the marks, some measures between the points, the width and the height of unfolding.

On viewing area you will have the representation of values of the dimensions on figure of the unfolding. Sometimes the position that the measures meet won´t be good to printing the figure, then you can click on scroll bar to arrange a new position for the measures (showed on example). After to choose the wished position of the measures click on “Print” button to print the unfolding with dimensions.

Scroll Bar



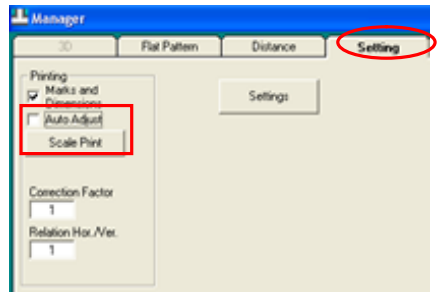

Example:



§ **Printing in scale:**

There is just a different way of printing that is called of printing in scale. This way is done when you remove the auto adjust of the unfolding being able assign a scale to printing your unfolding.

On flat **Setting** remove the mark “Auto Adjust” and then click on “Scale Print” button.

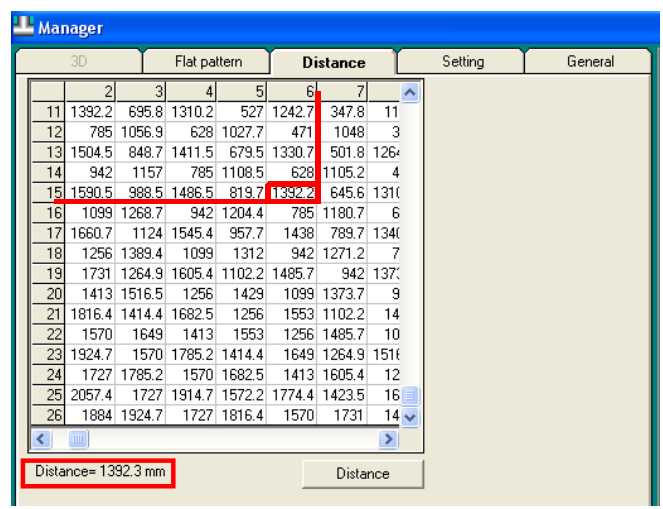



The only difference between the scale printing screen and the standard printing screen is that you choose the scale that figure will be print, can use the already defined (1:1 to 1:100) or using your measure (Other). To the side of the scale you will have the measure of the figure.

- **Distance toolbar:**

When clicking on “Distance” toolbar, a single button will be displayed (with the same name of the toolbar). Click on this button to allow that all distances between all points of the flat pattern are calculated. Once the calculation is complete, a screen like this will be displayed.

On this table, all distances between all points of the flat pattern will be entered. So if you click on one of the distances, this distance will be displayed on the piece that will be entered in the Viewing Area, and it will also be displayed on the bottom part of the chart. As a reminder, the table works as a chart allowing a point on top and another on the left. We used, as an example, points 6 and 15. However, to allow the point to be displayed on the piece, you need to click on the cell where the required horizontal and vertical points match.

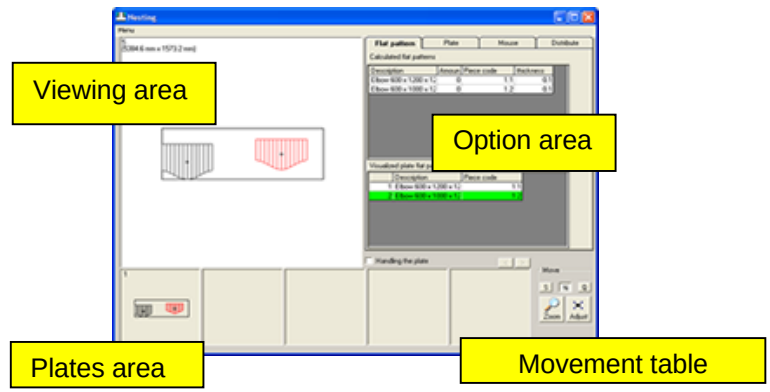



| | 2 | 3 | 4 | 5 | 6 | 7 | |
|---|---|---|---|---|---|---|---|
| 11 | 1392.2 | 695.8 | 1310.2 | 527 | 1242.7 | 347.8 | 11 |
| 12 | 785 | 1056.9 | 628 | 1027.7 | 471 | 1048 | 3 |
| 13 | 1504.5 | 848.7 | 1411.5 | 679.5 | 1330.7 | 501.8 | 126 |
| 14 | 942 | 1157 | 785 | 1108.5 | 628 | 1105.2 | 4 |
| 15 | 1590.5 | 988.5 | 1486.5 | 819.7 | 1392.2 | 645.6 | 131 |
| 16 | 1099 | 1268.7 | 942 | 1204.4 | 785 | 1180.7 | 6 |
| 17 | 1660.7 | 1124 | 1545.4 | 957.7 | 1438 | 789.7 | 134 |
| 18 | 1256 | 1389.4 | 1099 | 1312 | 942 | 1271.2 | 7 |
| 19 | 1731 | 1264.9 | 1605.4 | 1102.2 | 1485.7 | 942 | 137 |
| 20 | 1413 | 1516.5 | 1256 | 1429 | 1099 | 1373.7 | 9 |
| 21 | 1816.4 | 1414.4 | 1682.5 | 1256 | 1553 | 1102.2 | 14 |
| 22 | 1570 | 1649 | 1413 | 1553 | 1256 | 1485.7 | 10 |
| 23 | 1924.7 | 1570 | 1785.2 | 1414.4 | 1649 | 1264.9 | 151 |
| 24 | 1727 | 1785.2 | 1570 | 1682.5 | 1413 | 1605.4 | 12 |
| 25 | 2057.4 | 1727 | 1914.7 | 1572.2 | 1774.4 | 1423.5 | 16 |
| 26 | 1884 | 1924.7 | 1727 | 1816.4 | 1570 | 1731 | 14 |

The Nesting system allows a distribution of the flat patterns on the steel plates, reducing scraps and specially informing the operator how to place the pieces and avoiding points out of the steel plate, waste of time or further amendments.

To use Nesting option, you need to calculate the required pieces and then click on **"Nesting"** button.
See on the right the **"Nesting"** function screen.

As an example, we will apply a Bend tapered with five segments and 3.2mm thickness.

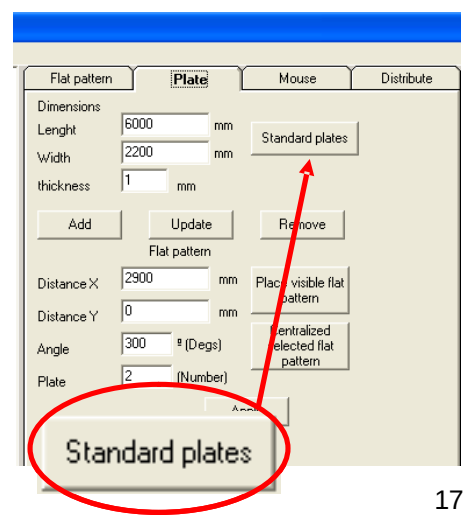



§ Defining the steel plate:

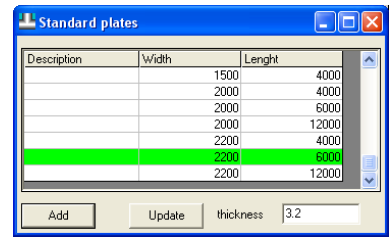
There are two ways to define the steel plate that will be used on the distribution of pieces. One is done manually (typing the steel plate data), and the other is done applying the pattern standard steel plates offered by the software (which can be also added later to the standard of your company).

**Defining steel plate manually:** to create a steel plate manually to be applied on the Nesting option, you just need to complete the "Dimensions" field with the required data.

**Example:** We will create an 8000X3000mm steel plate. To do that, we will fill the length with 8000mm and width with 3000mm, and fill in the thickness with the same calculated flat pattern of 3.2mm (use dot (.) as decimal spacer instead of comma (,). After that, click on **"Add"** button. To remove a steel plate, you just need to select this steel plate on the steel plate area and click on "Remove" button. To change a steel plate, you just need to select it. Change the values and then click on "Update" button.



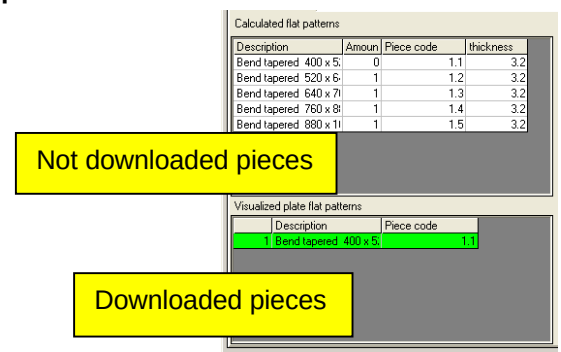
**Selecting a standard steel plate:** To select a standard a steel plate, you just need to click on the "Standard Plates" option, select one of the options and then click on "Add" button.




So to allow distribution of flat patterns, two steel plates will be applied: one with 8000X3000mm and another with 6000X2000mm.

§ **Downloading flat patterns onto steel plates:**

First select the steel plate (on the plate area) where you wish to place the flat pattern. Then click on the "Flat pattern" toolbar. Click twice on the piece that you wish to have downloaded.



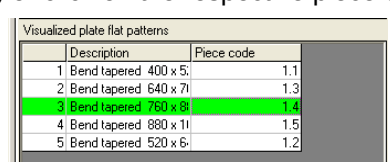

To download all pieces, go to "Distribute" toolbar and click on "Download all pieces" option and all pieces will be downloaded onto the selected steel plate.

**Distributing the pieces on the steel plate:** There are two ways to distribute the pieces on the plate: one manual and the other automatic.

§ **Distributing manually:**

To distribute the pieces manually, you just need to select the flat pattern and move it with the mouse by using the left button to move, and the right button to rotate.

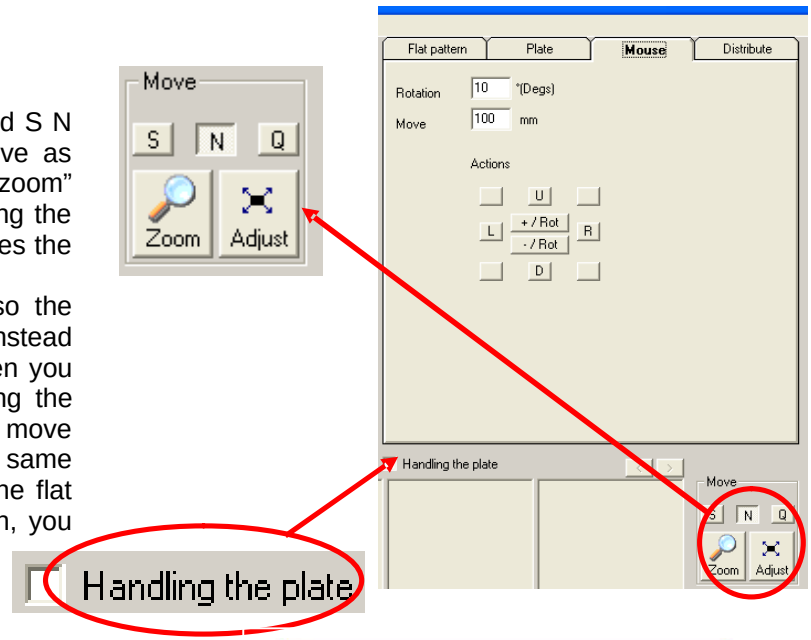
**Selecting flat patterns:** To select a flat pattern, you just need to press shift and click on the required flat pattern (the closest possible from the flat pattern center point) or click on the respective piece on the chart of downloaded pieces.


Visualized plate flat patterns
Description
Piece code
1 Bend tapered 400 x 5: 1.1
2 Bend tapered 640 x 7: 1.3
3 Bend tapered 760 x 8: 1.4
4 Bend tapered 880 x 1: 1.5
5 Bend tapered 520 x 6: 1.2

On the “Mouse” toolbar, you can control the moving angle of the flat patterns. On our example, we have 10* for “Rotate” and 100mm for “Move”. Note that Normal is written on the side. That means it will be the N value of the Moving Table. If S (slow motion) is selected, the two values will be dividing by 10, and if Q (quick motion) is selected, then the two values will be multiplying by 10. Therefore, the example shows that we have on S 1* of rotation and 10mm of movement, and on Q we have 100* of rotation and 1000mm of movement.

**Movement table:**

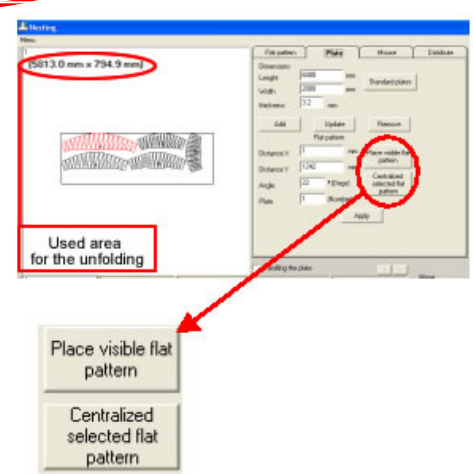
On the movement table, you will find S N Q functions already explained above as well as zoom functions. The “zoom” serves as a support when distributing the pieces, and the “Adjust” button makes the steel plate return to normal size.
To support the zoom, there is also the option of moving the whole piece instead of moving only the flat pattern. Then you just need to click on the “Handling the plate” option and you will be able to move the whole steel plate by using the same scale that was available to move the flat pattern. To return to the flat pattern, you just need to clear the box.




**Flat Pattern coordinates:**

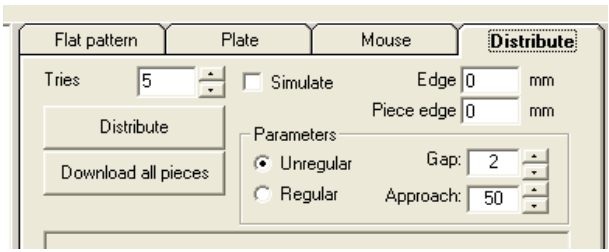
On the “Plate” toolbar, you can either view or change the coordinates of the selected flat pattern, having “Distance X”, “Distance Y”, “Angle” and “Plate”. All of them can be changed. To do that, you just need to change the value and then click on “Apply”. Use the “Plate” option to change the flat pattern and a steel plate by other.

On this area there are also two buttons: “Place visible flat pattern” and “Centralized selected flat pattern”. The first button is applied when you move a piece and it goes out of the viewing area. Clicking on it, the piece will come back to the area. The second button serves to make the selected flat pattern the center of the viewing area.



§ **Distributing automatically:**

To distribute flat patterns automatically, download them onto the required steel plate and go to “Distribute” toolbar. There you will find the following options:




**Tries:** represents the number of distribution tries.
**Simulate:** applied to view the simulation or not
**Irregular:** ideal for different shape pieces as it performs the tries by rotating the pieces at $90^{o}$ steps.
**Regular:** ideal for similar shape pieces as it does not allow the pieces rotate at $90^{o}$ steps.
**Gap:** jump given in millimeters trying to find out the best finishing configuration (the smaller, the more precise; however, slower).
**Approach:** jump given in millimeters trying to get the best zoom in configuration (the smaller, the slower).
**Edge:** space left in the edge of the plate without being used
**Piece Edge:** least space space that the automatic distribution will leave between the parts (unfolding).

NOTE: If any piece does not fit on the metal sheet when you make a selection to download all parts, it will return to the area of non-downloaded pieces.

**On the “Menu” you will find:**

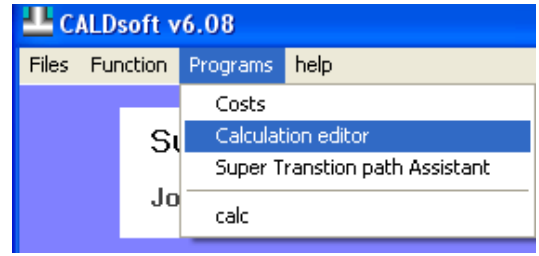
**Edit standard steel plates:** where you can add standard steel plate of your company.

**Export DXF:** save the selected steel plate onto dxf file.

**Print:** prints out the selected steel plate.

**Exit:** leaves the Nesting area for the initial software screen.

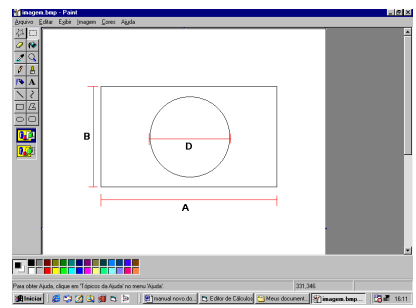
To design your own figures, click on the "Programs / Calculation Editor" menu




Note: It is important that you first make a draft of your figure and a picture showing all variables of the figure. The draft may be done manually and then scanned, or it can be done on any image generating software. (Corel, Paint, Word, etc).

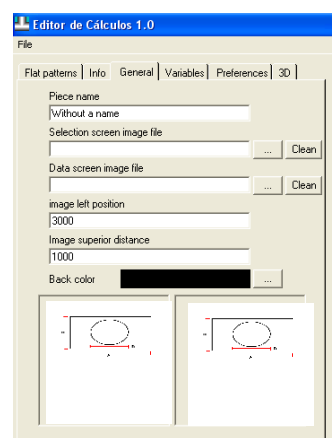
Example 1: As first example, we will draw a single image to primarily understand the software. Then we will draw a more technical piece.

Our piece will be a rectangle with a circle in the center.
First we will design the images to be used on the CALDsoft.




Now we will start designing the image on the Image Editor of CALDsoft. First you must fill in the blanks of the "General" toolbar.

**Piece name:** the piece name will be defined here.




**Selection screen image file:** this file will include the image that you wish to display on the image selection screen.

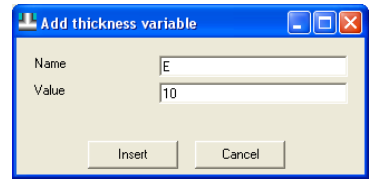
**Data screen image file:** here you will select the image that you will be displayed on the calculation screen.

**Left position of the image:** here you will define the horizontal distance in pixels of the image top left corner with the top left corner of the screen.

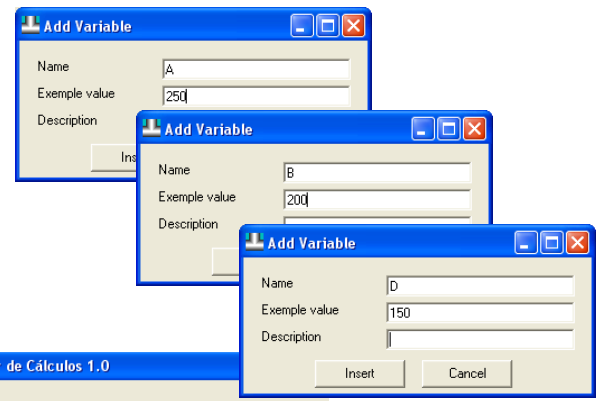
**Back color:** here you will select the background color for the selected screen image (try to select a color similar to the selected image color).

**Adding variables:**

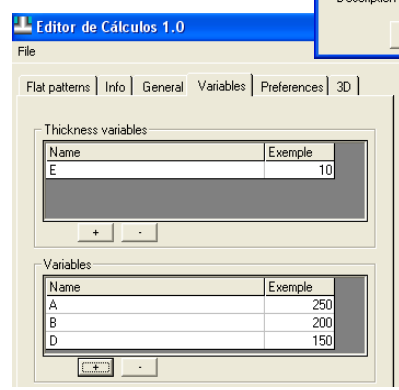
On the **"Variables"** toolbar you will add the variables of your figure. The first variable to be added id the thickness. Click on add **(+)** and type the thickness name and value.




Once you have defined the thickness (es) it is then time to define the variables. On the piece that we will use as example, we will have three variables: A, B and D.
To add a variable, click on "Add", type the name, a variable value and click on "Add". To redefine a variable, you just need to click twice on it, change the value and then click on "Change" button.
On the "Description" option you can add the variable description

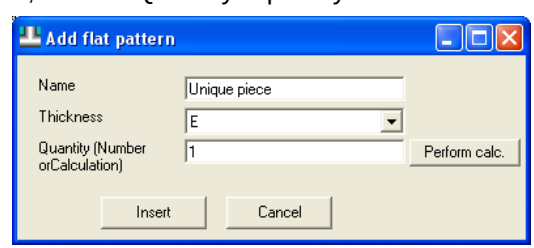



At the end, the "Variables" toolbar of your example will be as shown herewith:

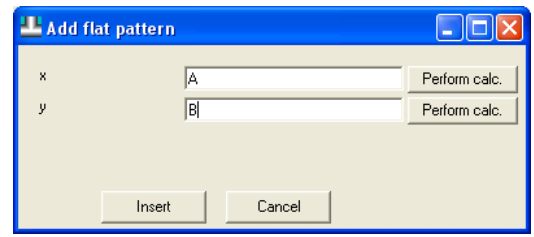


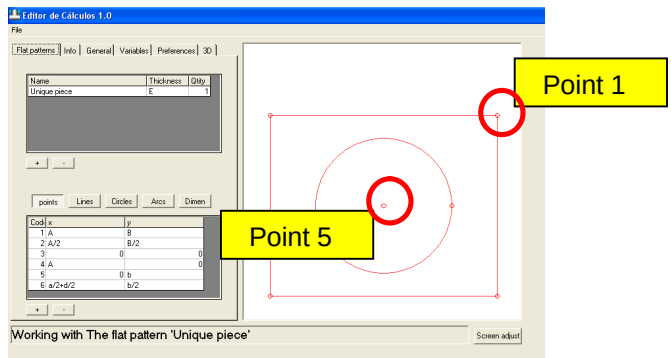

§ **Setting flat patterns**

On the "flat pattern" toolbar you will create your own flat pattern (s) starting with the flat pattern name; as on our example there is a flat pattern, we will use the name "Unique piece"; on the "Thickness" blank you will select one of the thickness created on the previous topic; on the "Quantity" option you can add all flat patterns that form the piece.

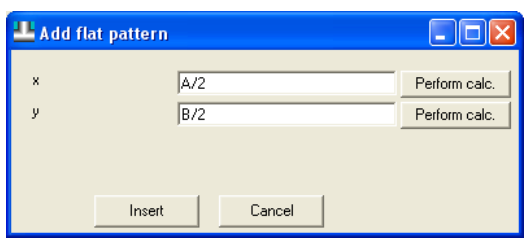


Now it is time to design the points of your piece. To add any data, click on (+) and type the coordinates X and Y of the referred point. On our example, we have six points: four to design the rectangle and two to design the circle. To add the coordinates X and Y, you can now use the variables. For example, the point 4 of the rectangle has on X the variable A, and on Y the variable B.

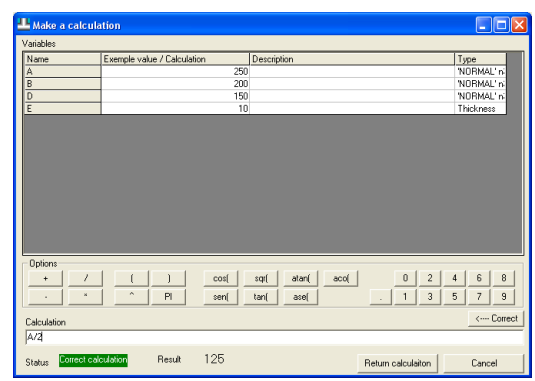



You can also perform a calculation using the variables to design a point as it was done to place a point on the center of the rectangle (that will be also the center of the circle). To define that, we noticed that the center is a point on the middle position of the base and on the half of the height. So we have on X = A / 2 and on Y = B / 2.

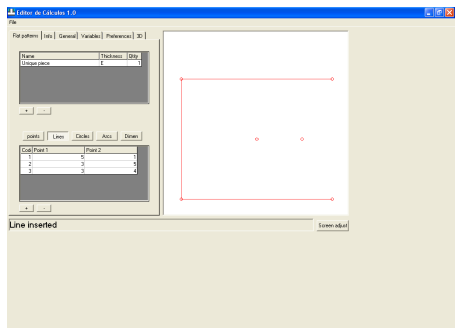



You have two ways to perform the calculation: one is done by typing the calculation on the coordinate area, and the other is done by clicking on the “Perform calc.” option and perform the calculation on the calculator. To perform the calculation on the calculator, you need to click twice on the selected variable and then apply all required operations. If required, you can add another or more variables to your calculation. Once the calculation is complete, click on “Return Calculation”.



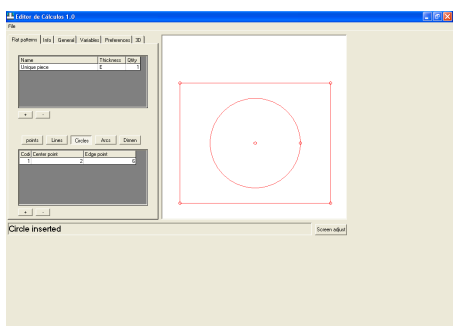
- **Creating lines:**

Now that we have all six points defined, we then can define lines for them. To do that, you just need to click on “Lines” and then on (+). The next step is to select the two points that you wish to have joined. So we have a rectangle.



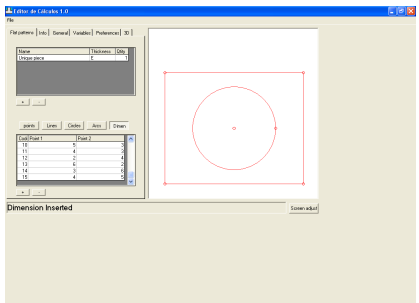
- **Creating circles:**

Now let’s place the circle on the center of the rectangle. Click on “Circle” and then on add ( + ); select a point to be the center of the circle and another point to be the border.



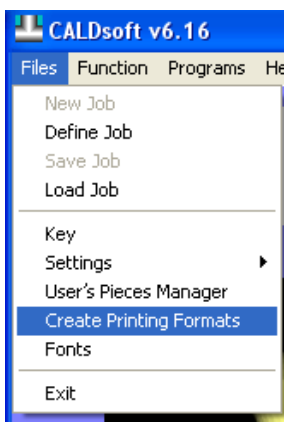
- **Creating dimensions:**

To create a dimension, you just need to click on “Dimensions” and then on the “Add” ( + ) button. Select a point to be the first and another to be the second. So you have a dimension.



These dimensions are displayed when you calculate the piece and view the results.

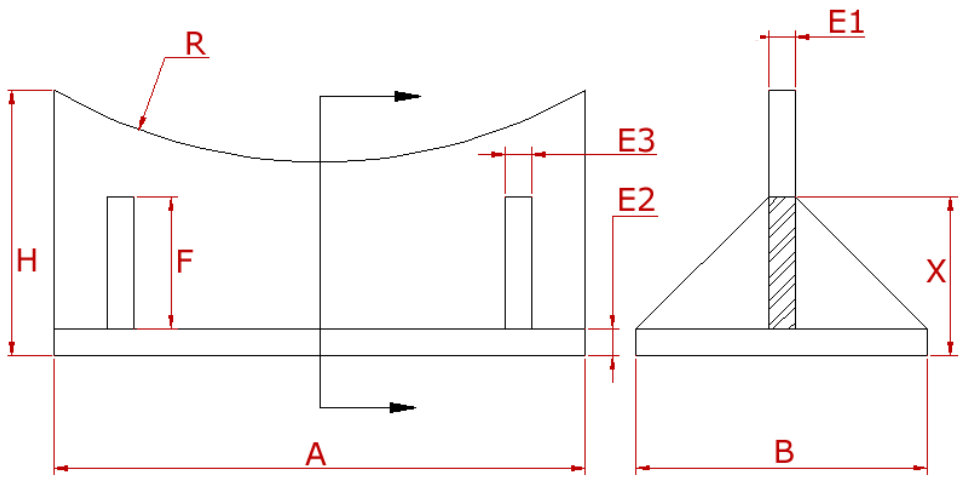
Our piece is now complete. Click on the “File” option on the top corner of the screen and save it. On the CALDsoft6 software enter **on Files / Manager of user’s pieces** option and click on **Options / include calculation,** and add your calculation to your selection list.



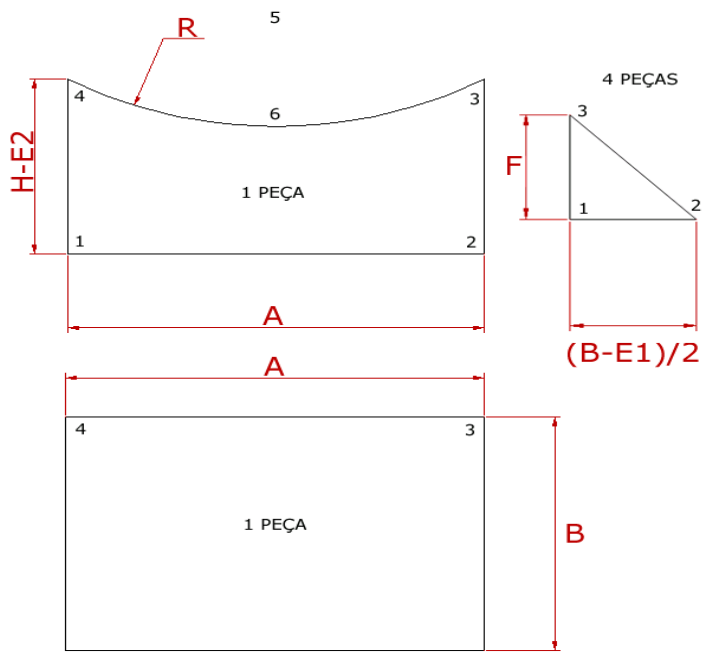

Tip offered by Mathematics experts to use on the calculations:

Multiplication: *
Division: /
Exponential: ^ example: 9^2 = 81
Square root: sqr( ) example: sqr(81) = 9

Example 2: As second example, we will design a piece by using arcs and trigonometric functions.

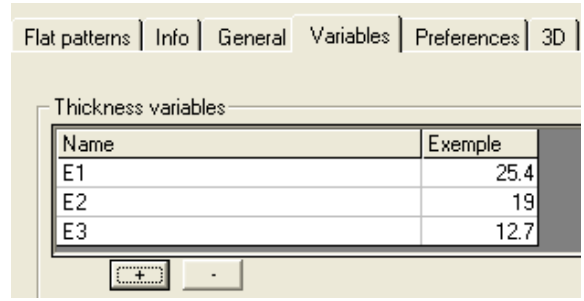



Initial draft of the 3 different flat patterns:



**Step 1:** define the 3 thickness variables

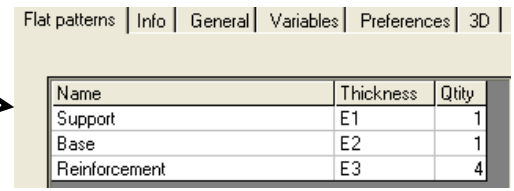
E1=25.4, E2=19 e E3=12.7




**Step 2:** define the 5 required variables

A = 600, B = 400, R=1000, F=240 e H=300

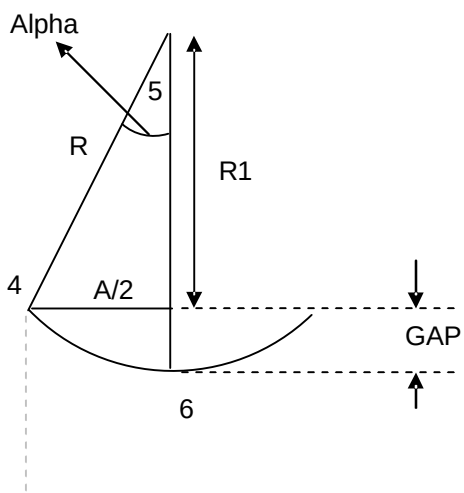
**Step 3:** define the different flat patterns.




**Step 4:** defining “support” flat patterns. To do that, click on the flat pattern on the flat pattern list (see if on the bottom toolbar of the screen the following message is displayed: working with “support”)

Defining the points of the “support” flat pattern:

Points 1, 2, 3 and 4 are easy-to-determine. However, points 5 and 6 require some extra calculations.




Let’s create the extra variables

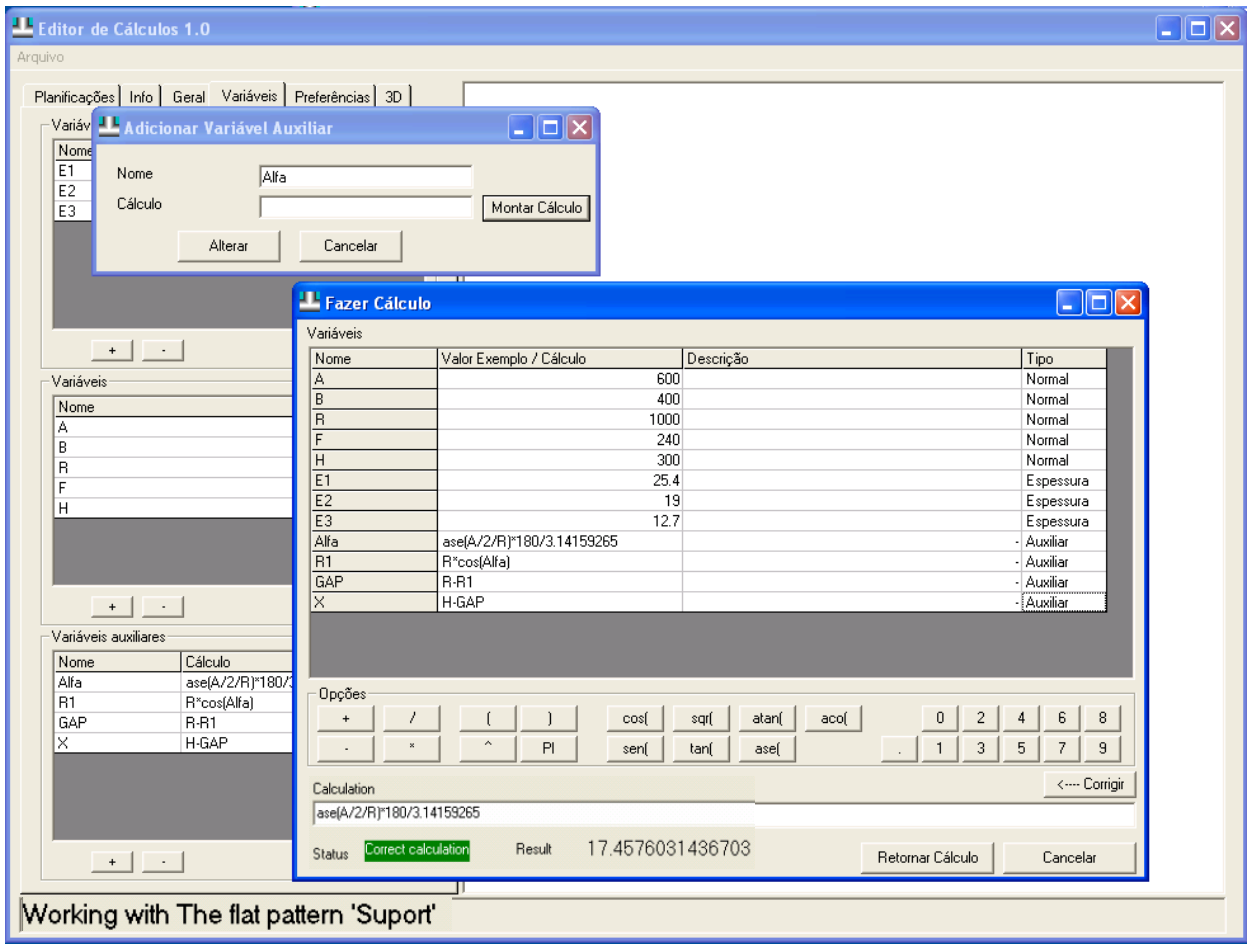
Alpha = ase(A/2/R)*180/3.14159265

This is Alpha = Sinarc ( (A/2) / R ) in radii, and multiplied by 180 and divided by Pi to convert into degrees.

R1 = R * cos (Alpha)

GAP = R – R1

X = H - GAP




To add an auxiliar variable you just have to click on "+", in Auxiliar Variables, enter with the name and then click on "Perform Calc" to create the desired calculation. You can use in the calculations the other variables previously created.

| Point | X | Y |
|---|---|---|
| 1 | 0 | 0 |
| 2 | A | 0 |
| 3 | A | H-E2 |
| 4 | 0 | H-E2 |
| 5 | A/2 | H-E2+R1 |
| 6 | A/2 | H-E2-GAP |

**Tip:**
To type the coordinate Y of point 4 (which is equal to point 3), you can only type **=3**, once the program figures out as being equal to that typed on the coordinate Y of point 3.

**Defining the lines of the "support" flat pattern**

| line | Initial Point | End Point |
|---|---|---|
| 1 | 1 | 2 |
| 2 | 2 | 3 |
| 3 | 1 | 4 |

**Defining the arc of the "support" flat pattern**

| Arc | Center point | Border point | Angle |
|---|---|---|---|
| 1 | 5 | 4 | 2*Alpha |

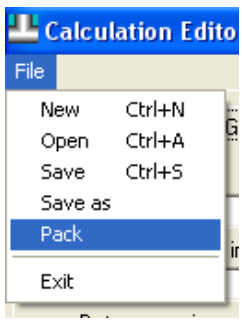
A center point and a border point, plus an angle drawn by the arc, which is measured in degrees, define all arcs. It starts on the border point and performs counter clock-wise.

**Adding extra data:**

On the INFO toolbar you can define some data as a text, which will be presented in the CALDsoft6 (they are also printed on the drawings).

§ **How to install a new format:**

As you finish the drawing of the new figure/shape, click on File/Pack. Then, a file will be created in the out folder (ex: RectangularFlange.tar), then, transfer this file to the download folder, and when CALDsoft is initialized it will recognize that file automatically.



Additional information about how to create shapes/figures with CALDsoft can always be acquired at Caldclub in our web page in the net. There you will also be able to download new done by our group or by other users.

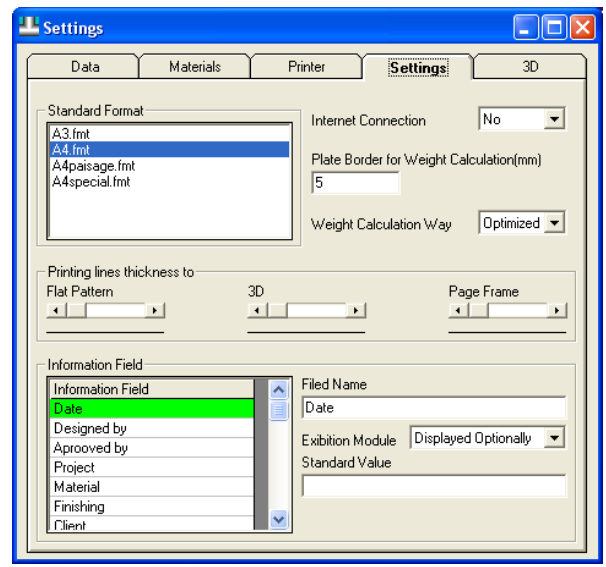
To customize your CALDsoft6 on the selecting screen, click on **File/Settings** button and select what you wish to customize.

**Data:** it files your company data.

**Printer machine:** it adds the data of your printing machine. It is only important if you wish to print in scale.

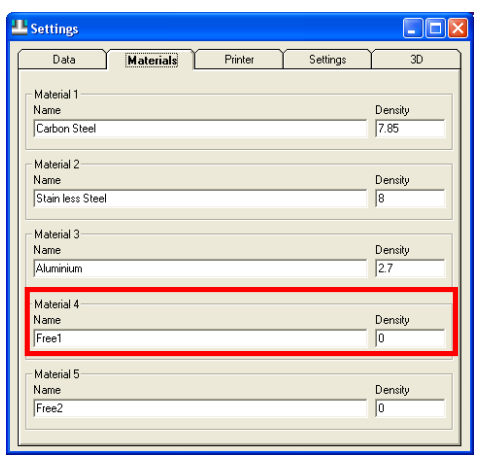
**Settings:** it changes the main settings of CALDsoft6.

**3D:** it changes the 3D interface of the "Manager".




- **Materials:**

On this toolbar you will be able to change the materials and create your own materials. As an example, we will Polypropylene that has 1.2 of density. If required, you may change the default of the materials by changing the first item in the list by the item mostly used in your company.




Note: the density does not have a unit, and it is the ratio of specific weight of the desired material by the water specific weight.

D polypropylene: SW polypropylene / water SW

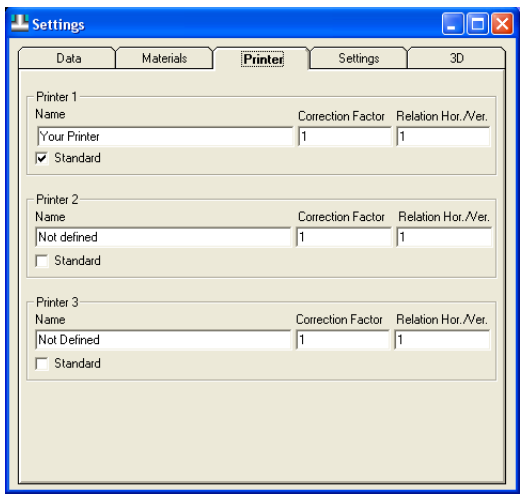
D polypropylene: 1200 kg/m3 / 1000 kg/m3

D polypropylene: 1.2

- **Printer:**

Here you will be able to register your printer(s), putting printer name, correction factor and the Horizontal/Vertical Ratio. The items are only required if you intend to print the exact scale flat patterns. It is usual on light and small size boiler pieces print parts in plotter at 1:1 ratio to serve as pattern for the operator to cut the pieces.

Correction factor must be also used to correct printed size on the paper in reference the size defined on the formats. Ex: if on the format you have defined a line with 100 mm and, on the printing, it came out with 98 mm, the correction factor for this printer is **100/98 = 1.020**.

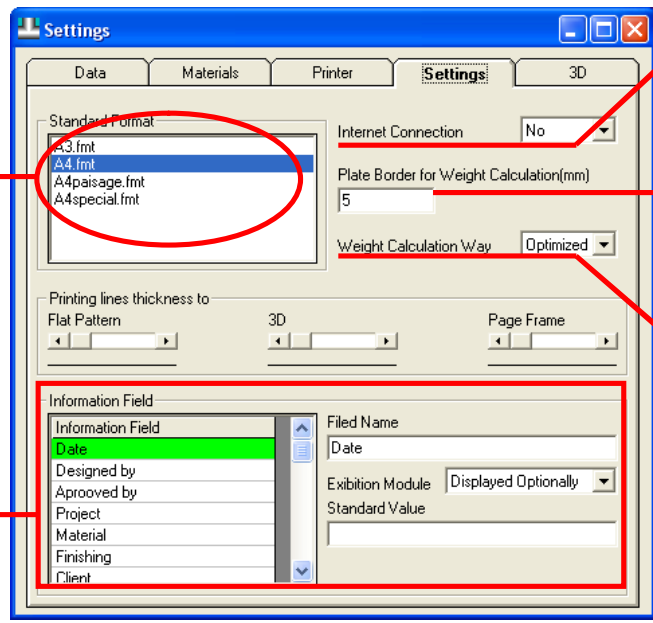



The **Relation Horizontal/Vertical** is a factor that adjust the horizontal axis in reference to paper vertical axis once it is common for plotting equipment become worn resulting in losing original dimensions on both opposite directions.
See further information about printing on the specific chapter.

**Note: When the printing process is selected in scale 1:1, the marks are "mirrored", if the user wants external marks is needed to calculate using the internal marks, then due mirror effect will print the external marks as desired.**

- **Settings:**

Here you will set the main options of CALDsoft and they are listed below:




It selects the desired page printing format

We will see this below

Here you will indicate if there is or not Internet access.

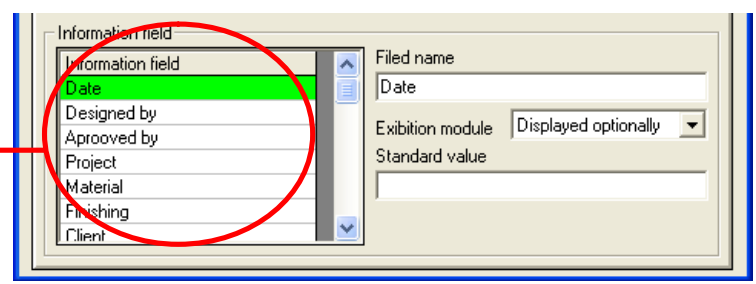
Border considered around the flat pattern on the weight calculation

Here you will have two types of options:
Normal – which will find the weight of the smallest steel plate that supports the flat pattern at the position it is found.
Optimized: which finds the weight of the smallest steel plate that supports the flat pattern dimensions.

**Information area:**

Here is the area where you will define the user variable so as to display them (and complete) at the time of the piece calculation. It is also defined here the standard to complete them automatically.

There are 8 information blanks and we can change the existing ones. If you wish to hide an information blank, you just need to set the Display Option as not displayed.



**Display Option:**

**Not displayed:** It will not display the desired field.

**Displayed optionally:** the field is available. However it does not mean it must be filled out.

**Mandatory display:** The calculation can only be made after this field is duly filled out.

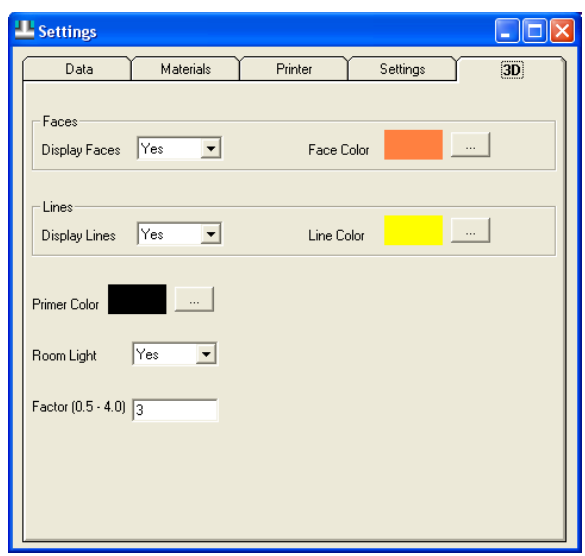
**Standard value**

On this field you will define the standard value of the variable. Example: you can create a field “Surface finishing” and on the standard value write “Blast and apply primer”.

If you click on the standard button at the time you fill out the information fields, they will be automatically completed with the standards.

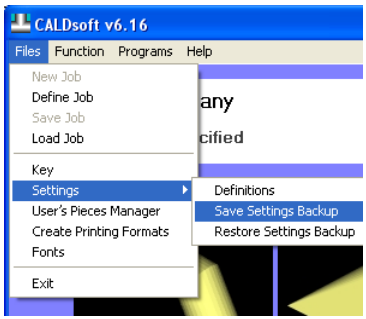
- **3D:**

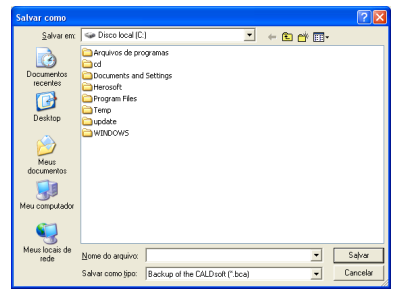
On the “3D” toolbar you will select the colors for faces and lines, and if both should or not be displayed. It also defines the primer color and it will include or not room light. And it determines the factor (animation figure size).



§ **Saving your configurations (backup)**

In case you wish to save your configurations, just click **Files\Settings\Settings backup**.



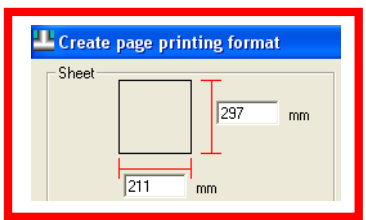




And to load previous configurations click **Files\Settings\Restore settings backup**, and select the file saved by yourself previously.

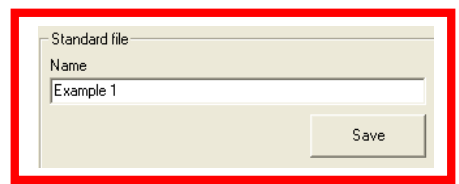
This is a simple way for you to use the constant free updates at www.caldsoft.com and not lose your private configurations.

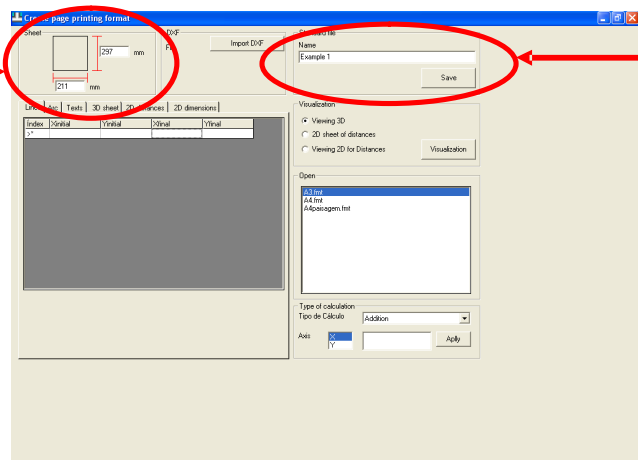
To create a page-printing format, you just need to click on **File/Create Printing Formats** on the selecting screen. On this screen you will be able to define how the printing of your calculation represented by dimensions, by distances or 3D interface will be.

We will start by selecting the paper size (A4 will be used: 211mm x 297mm). However, we should always use smaller size paper, as the printing requires a border when printing (on the example, we will use less 10mm: 201mm x 287mm). To define that, you just need to type on the "Create page printing formats" option the dimensions on the blank fields.




Define a name for your format and then you will save it by clicking on "Save".



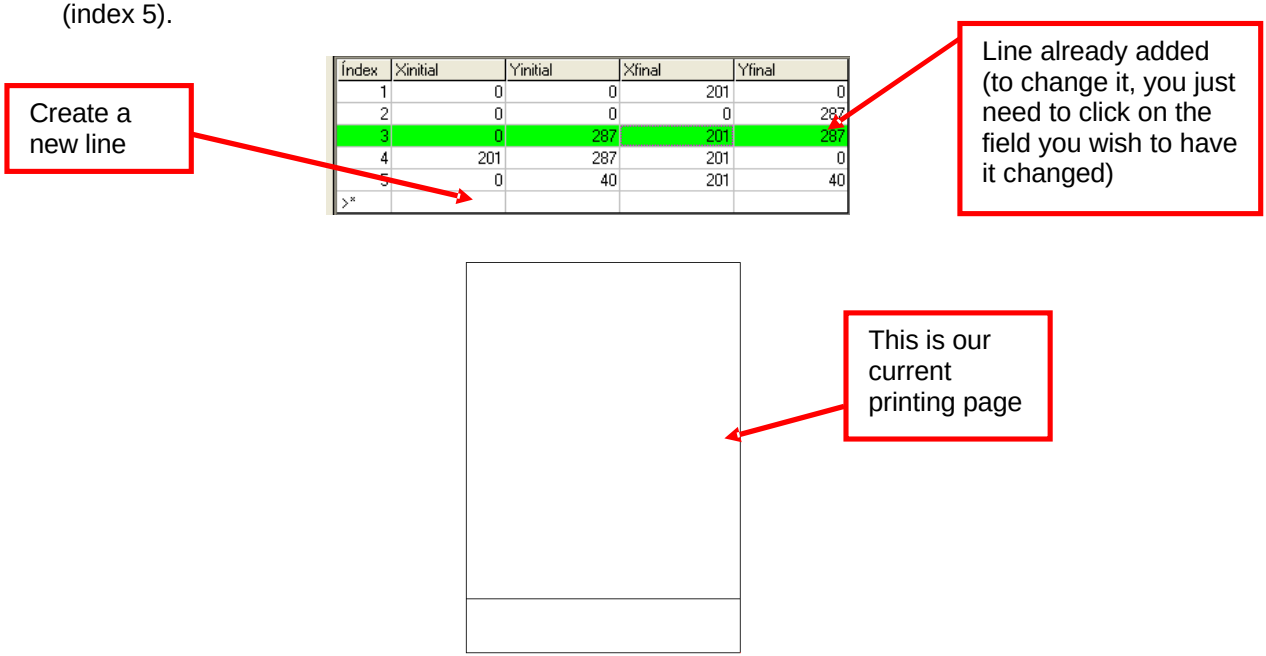
Now we will provide a border on the printing paper. This is done on the "Lines" toolbar.

To design a line, you just need to type the coordinates of your line on the page. This is done on the blank lines.

If you wish you might import DXF formats designed in CAD. To do that, and before changing any detail on the new printing format, you need to click on:

The DXF only interprets inputs: Line, Arc and Circle and at 1:1 ratio in mm. Text, polyline and Blocks will not be accepted.

We will design a line right on the border by using these coordinates (indexes 1, 2, 3 and 4)
We will also leave a baseboard on the page allowing you to include any information about the piece (index 5).


Create a new line
Line already added (to change it, you just need to click on the field you wish to have it changed)
This is our current printing page

| Índex | Xinitial | Yinitial | Xfinal | Yfinal |
|---|---|---|---|---|
| 1 | 0 | 0 | 201 | 0 |
| 2 | 0 | 0 | 0 | 287 |
| 3 | 0 | 287 | 201 | 287 |
| 4 | 201 | 287 | 201 | 0 |
| 5 | 0 | 40 | 201 | 40 |

Now we will then create a text on the printing page. To do that, click on “Text” toolbar and on the blank line on the first page type the desired text; on the second and third, type on the page the coordinates X and Y of the text, and on the fourth type the code referred to the font that you wish to use (the list with the codes is available right below the line area of the text).

| | Font | Size | Note |
|---|---|---|---|
| 1 | arial | 9 | Normal text font |
| 2 | arial | 10 | Table font |
| 3 | arial | 11 | |
| 4 | arial | 12 | Title font |
| 5 | arial | 14 | |
| 6 | arial | 16 | |
| 7 | arial | 18 | |

There are three types of texts: fixed, the user's variables and the inner system variables.

- The fixed texts are those that cannot be changed.

- The user's variables texts are those that use the piece variables, already set on the chapter "Setting CALDsoft" and filled out at the moment the piece is calculated (Ex: Material, Design, Designer, etc).
- The inner system variables are those that are not changed directly by the user. These inner variables are listed below:

| **Variable name** | **Description** |
|---|---|
| Job | Job name |
| Codpiece | Piece code |
| Base_material | Piece material |
| Flat pattern_name | Name of viewed flat pattern |
| Weight | Flat pattern weight |
| Total_weight | Piece total weight |
| Thickness | Flat pattern thickness |
| Quantity | Quantity of required flat patterns |
| Note | User's note about the piece |
| Smallest plate | Smallest steel plate for the planification |
| Today | Today's date |
| Hour | Current time |
| Info1, info 2,...info8 | Info 1 up to info 8 (these are the variables defined by the user on settings) As standard on CALDsoft, the infos are the following: date, designed by, approved by, designed, material, finishing, and customer). |

Now we will create, as an example, a fixed text (a title) for the page. Here we will use a sample text (Text Printing Page). To do that, you just need to follow the steps described above.

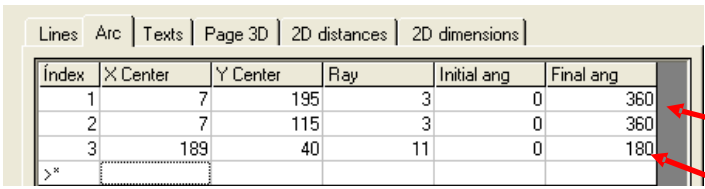
Then we will create two more texts: one with user's variables and another with the inner system variables. To create a text with a variable, you just need to write the desired variable between < >. For example: to apply the variable of the user **Material,** you need to write on the first column <Material>, and to apply the variable of the system **Job**, you need to type <Job>.

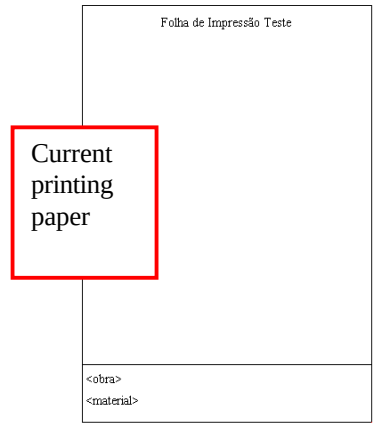
| Índex | Text | X | Y | Font |
|---|---|---|---|---|
| 1 | Example printing page | 55 | 280 | 4 |
| 2 | <job> | 2 | 35 | 4 |
| 3 | <material> | 2 | 20 | 4 |
| >* | | | | |

We will now make an example of a circle and one of an arc. The circles may serve as points and a paper-drilling machine will provide the holes to file the printing, and the arc serves as an example.

To do that, click on “Arc” toolbar and type the coordinates and desired values the same way it was done with the lines.

To design a complete circle, use initial angle 0 º and final angle 360 º.




Circle

Arc

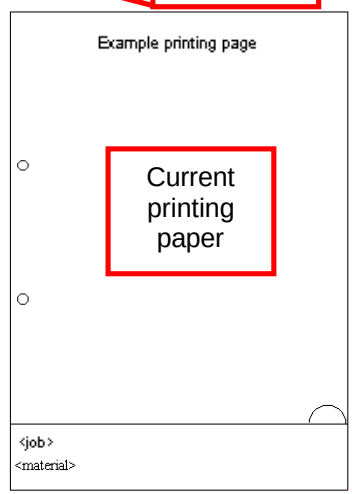
**Setting the three formats:**

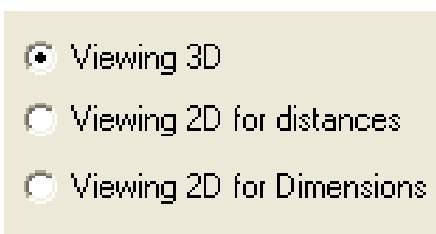
To set the printing format types, first you must select one of the following options:

**Viewing 3D:** it allows you to print your piece on 3D interface, viewing it on 3D Results.

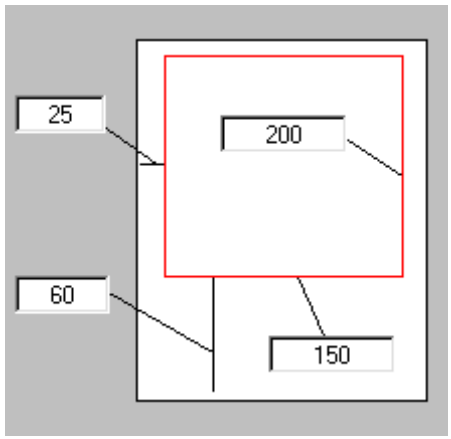
**Viewing 2D for Distances:** it allows you to print the desired Distances between points of your flat pattern.

**Viewing 2D for Dimensions:** it allows you to print the flat pattern with dimensions.




Click on the “Page 3D” toolbar and then define the desired distances for your 3D printing paper.

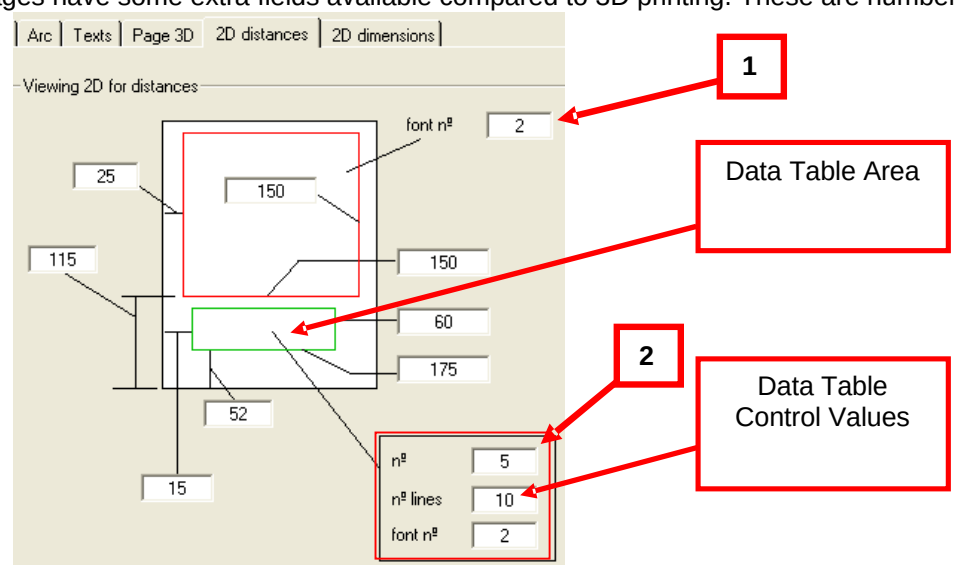



In this area you will define the line distances referred to the page borders and the dimensions of the figure printing area.

You must view the printing page by clicking on the “Viewing” button that is available right below the selecting button of the printing paper type.

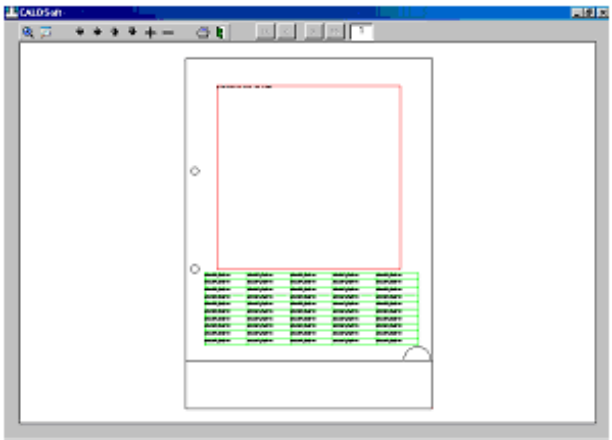
Same as on the design of a 3D printing page, the printing of 2D page for dimensions and 2D for distances is defined by clicking on the toolbar with the same name of the page type.

These two types of pages have some extra fields available compared to 3D printing. These are numbered and explained ahead:

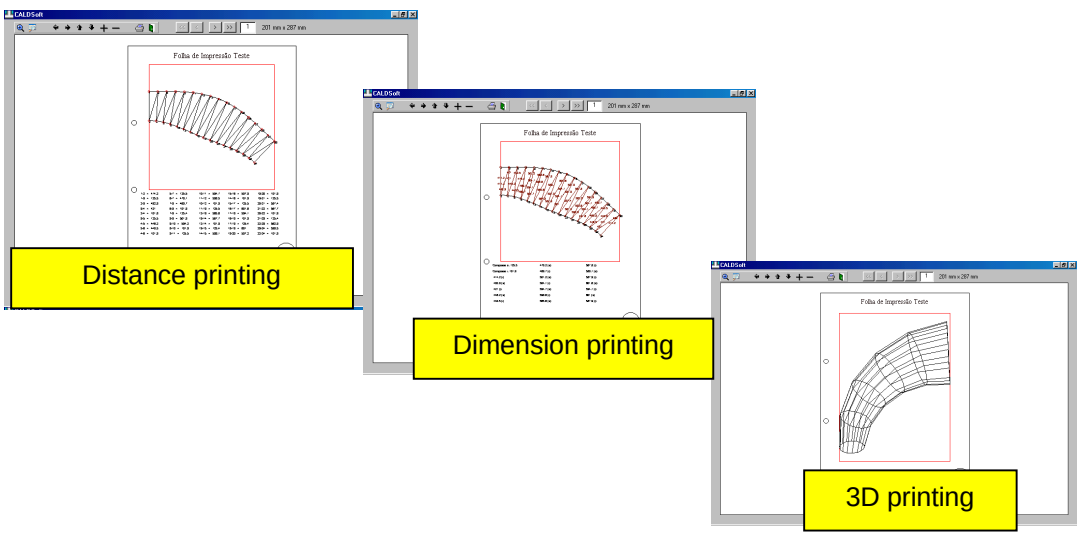



1 – It defines the font number (remember to use the “Texts” toolbar area to identify the defined fonts) of the flat pattern dimensions that you wish to print out (considering that there is not a figure that allows you to view, there is then a text that allows you to have an idea of the font size compared to the page).

2 – This area defines the quantity of columns and the quantity of lines to be included in the **data table.** It also defines the font size

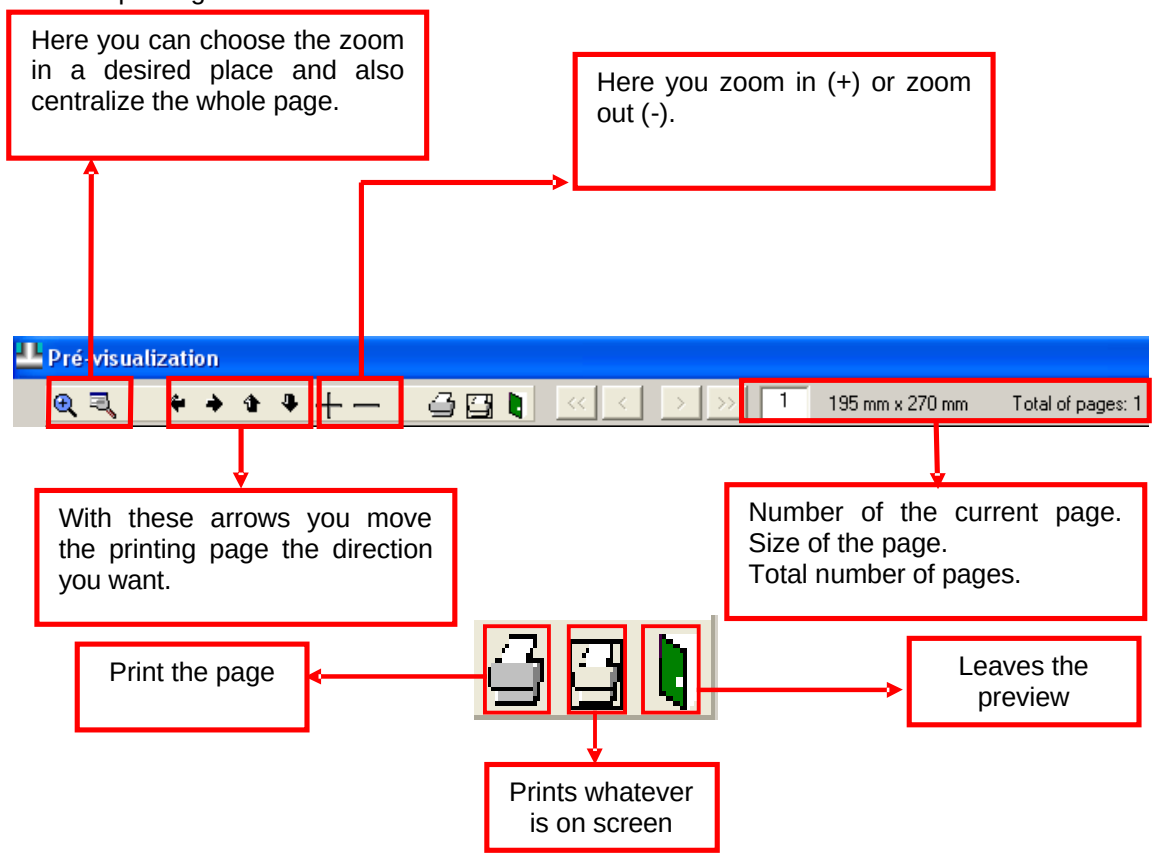


This is the final result of the printing page viewed inside the printing page editor.



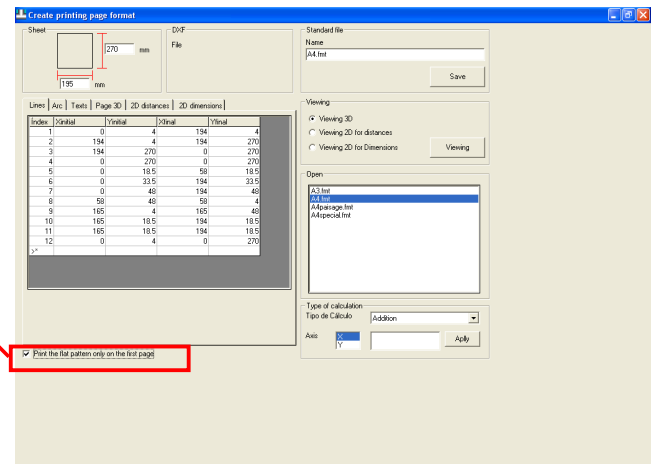
**Printing subtitles**:

Throughout the software you will find several printing icons availing a wide range of printings kinds. All these kinds of printing follow only one standard, so they can always be done the same way. Below we detail the printing screen:


Here you can choose the zoom in a desired place and also centralize the whole page.
Here you zoom in (+) or zoom out (-).
Pré-visualization
1
195 mm x 270 mm
Total of pages: 1
With these arrows you move the printing page the direction you want.
Number of the current page.
Size of the page.
Total number of pages.
Print the page
Leaves the preview
Prints whatever is on screen

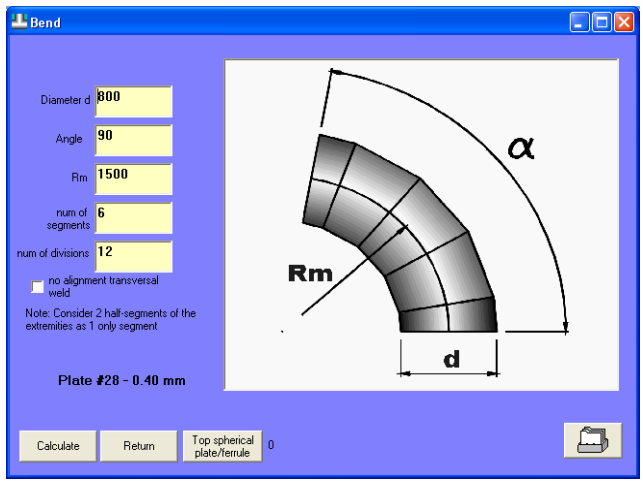
**Printing flat pattern only in the first page**

When you create the format you can choose if the flat pattern will be printed in all or only the first page, just select “print flat pattern only on the first page”.  This will save the user time and money.

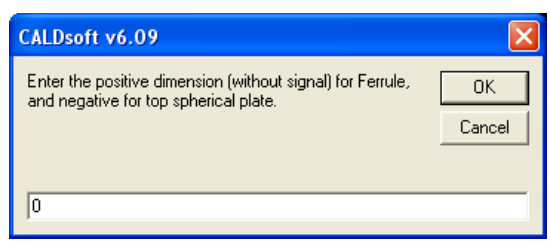


The figures of CALDspft6 do not require further explanations as all of them are supplied with an attached explanation. However, we will provide a few particular details and tips for some of them.

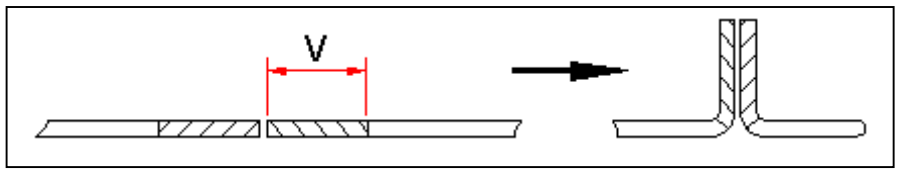
**Bend:**




To design of **Bend** with the application of fine steel plates, you may add more material to the segments width allowing these segments to bend and help joining them. This is called Ferrule. While for large gauge steel plates, it is important to reduce the section width, where the remaining part is finished with weld gap. Click on “Top spherical plate/ferrule” button to add the dimension.

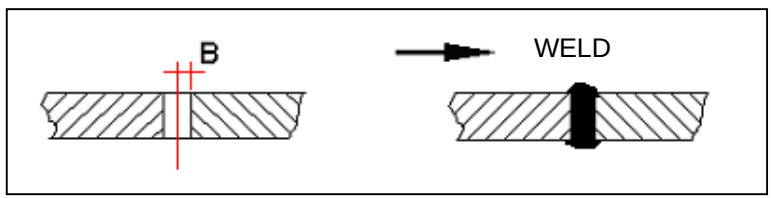


Enter the positive dimension (without signal) for Ferrule and negative for weld gap.



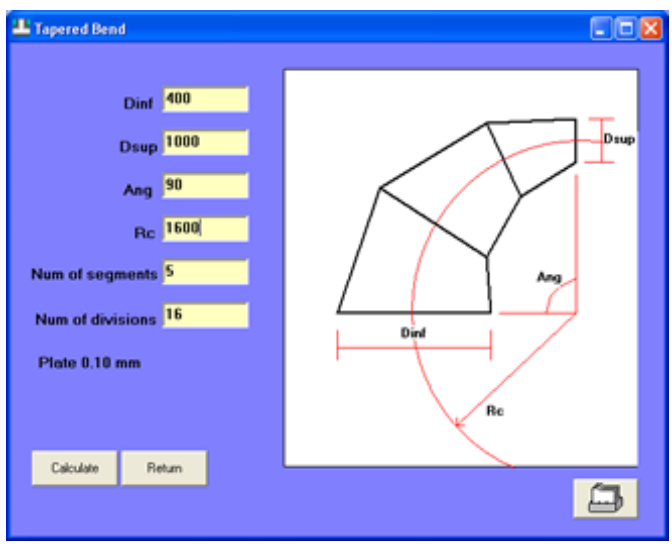

V – Ferrule dimension. The Ferrule dimension is added to the theoretical width of each section that is dent.

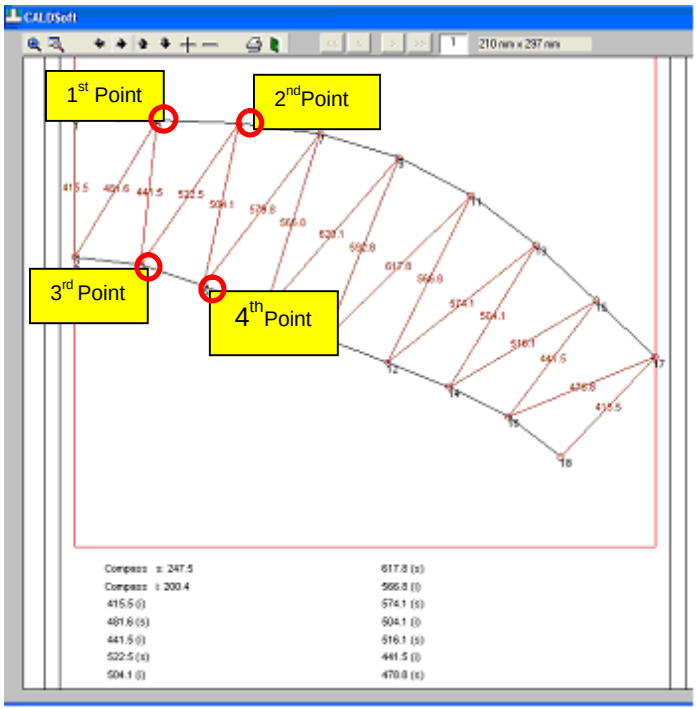
**Weld gap:**




B – Weld gap dimensions. The Weld gap dimension is taken from the theoretical width of each section

**Tapered bend**






The program calculates all sections as individual units allowing individual way designing for better use of the steel plate. Based on conventional geometric methods, all sections must be designed at the same time making the design of larger dimension curves more difficult.

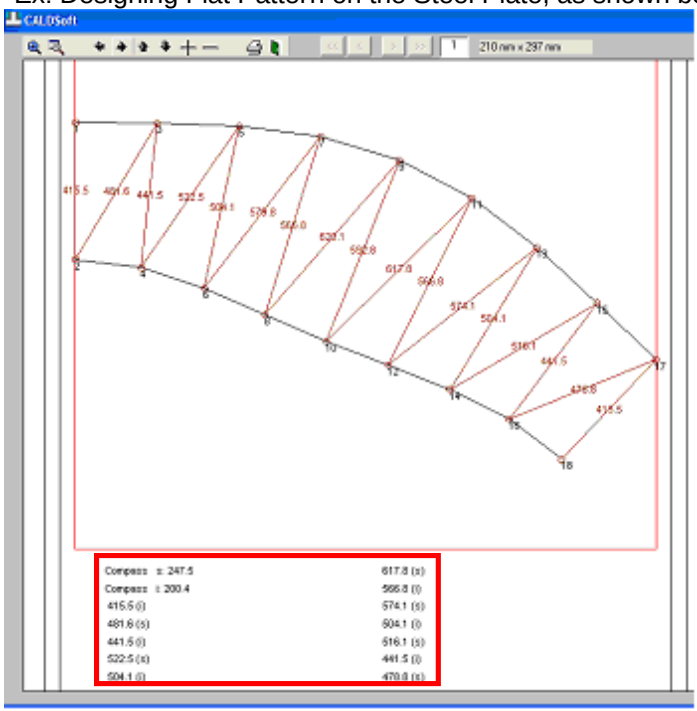
**Tip:**
When designing, use two small compasses and a tape with the application of the Triangle Method (as shown above)

Design the 1st line with 415.5mm
Open a compass with 247.5mm and the other with 200.4mm
Use the tape with the dimensions of the diagonals.

1st point – tape = 481.6mm / compass 1 with 247.5mm
2nd point – tape = 441.5mm / compass 2 with 200.4mm
3rd point – tape = 522.5mm / compass 1 with 247.5mm
4th point – tape = 504.1mm / compass 2 with 200.4mm
And so on...

**Understanding the Triangle Method:**

Ex: Designing Flat Pattern on the Steel Plate, as shown below:




Step 1: Prepare the instruments

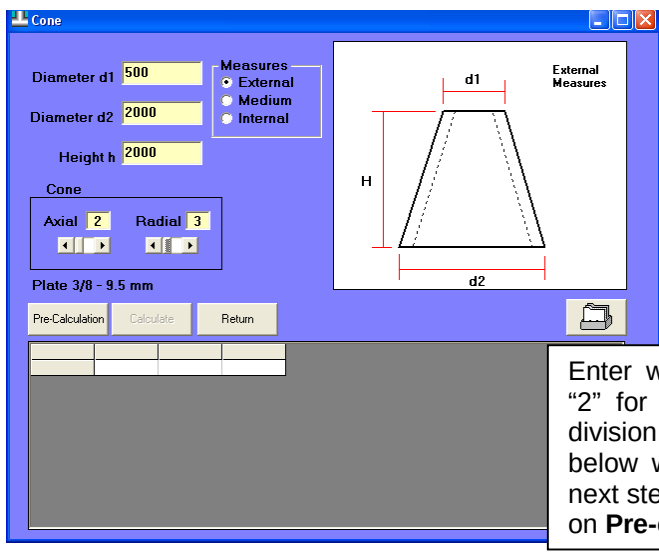
- § Take 2 compasses, 1 tracer, 1 tape and 1 puncher
- § Open the compasses, one with dimension of 200.4mm (Compass 1) and the other with the dimension of 153.3mm (Compass 2), as shown on the figure above.

Step 2: Design on the steel plate line 1 – 2 vertically, with dimension 434.1mm;
Step 3: Place one of the points of the Compass 1 on the point 1 (as per figure);
Step 4: Place the end of the tape on point 2;
Step 5: With the tape at dimension of 477.4mm, cross it with the other point of Compass 1;
Step 6: When they intersect, mark this point with the puncher, identified on the figure as point 3;
Step 7: On the point 2, place one of the points of Compass 2;
Step 8: With the end of the tape on point 3, set it at dimension of 454.6mm;
Step 9: Cross the tape with the other point of Compass 2;
Step 10: Where they intersect, mark this point with the puncher, identified on the figure as point 4;
Step 11: Now place the point of Compass 1 that was on point 1 on point 3;

Step 12: Place the end of the tape on point 4;
Step 13: With the tape at dimension of 511.6mm, cross it with the other point of Compass 1;
Step 14: Where they intersect, mark this point with the puncher, identified on the figure as point 5;
Step 15: Now place the point of Compass 2 that was on point 2 on point 4;
Step 16: Place the end of the tape on point 5;
Step 17: With the tape at dimension of 504.1mm, cross it with the other point of Compass 2;
Step 18: Where they intersect, mark this point with the puncher, identified on the figure as point 6;

Carry on the further steps until completing all points on the figure.

**Cone**




Enter with dimensional data and select "2" for axial division and "3" for radial division, or on the arrows of the fields below with their respective values. The next step, after viewing the picture, press on **Pre-calculation** button.

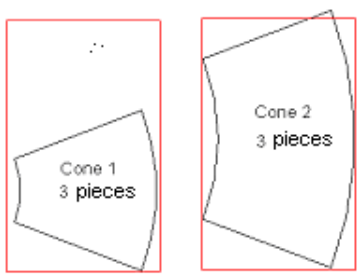
Ex: Cone of 3/8 steel plates with the following characteristics:

Height: 2000mm / Top diameter: 500mm / Bottom diameter: 2000mm
Calculate two overlapped cones and divide the flat pattern in three parts.

Based on the table, check the partial result that is found below the buttons:

| Cone | D1 | D2 | Height | Parts | Plate |
|---|---|---|---|---|---|
| 1 | 500 | 1250 | 1000 | 3 | 1114x1269 |
| 2 | 1250 | 2000 | 1000 | 3 | 1186x2037 |

Considering a steel plate of 1200mm x 200mm, we will have a problem with cone 2 as it requires a minimum plate length of 2037mm. Therefore, it does not fit on the available steel plate.

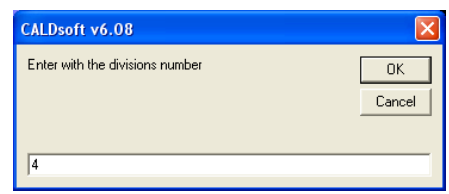



So we need to increase the radial subdivision of **Cone 2**: from **"3"** to **"4"** parts.

**Procedure**

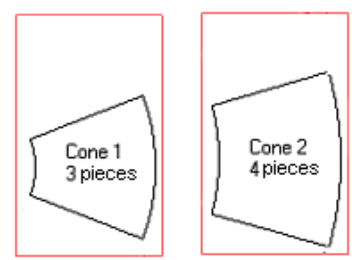
Click on value **"3"** of the column **"Parts"** of **Cone 2** from the table generated by the pre-calculation.

The following screen will be displayed:




Entering with value 4 and clicking on **OK** button, the pre-calculation will be performed again with the following result:

| d1 | d2 | h | Parts | Ri | Re | ang | Plate |
|---|---|---|---|---|---|---|---|
| 500 | 750 | 400 | 3 | 822.6 | 1241.7 | 35.7 | 458 x 762 |
| 750 | 1000 | 400 | 4 | 1240.1 | 1659.2 | 26.8 | 453 x 770 |

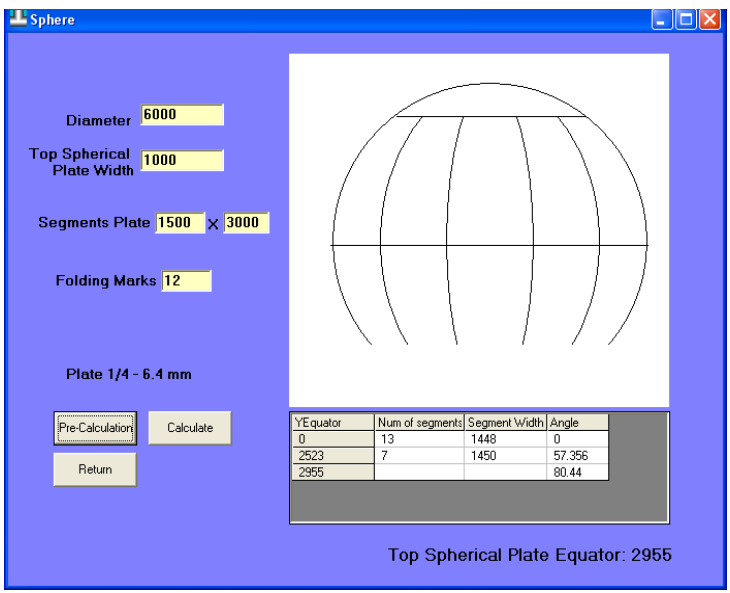


The new steel plate dimension for the sectors of Cone 2 will be: 1134 x 1543. Therefore, it will fit in the plate of 1200mm x 2000mm.

**Tip:**

The axial and radial sub-divisions of a cone help to take advantage of such plate. On the other hand, cutting cost, welding and assembling will increase.

**Sphere:**



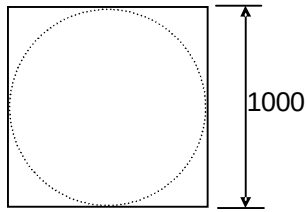

**Ex:**

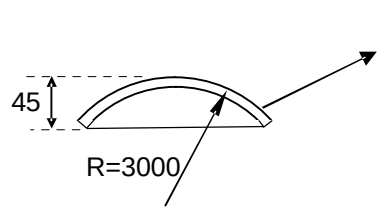
Calculate a pressure vase with outside diameter of 6m and ¼" thickness.

1st step:

Define the top spherical plate that must be manufactured through conformation and without joints. To define this top spherical plate. You just need to supply the steel plate width to be used and let the CALDsoft calculate the height automatically.

Plate width = 1000mm




We can notice that with a width of 1000mm

2º step:

Once the section steel plate has been defined, click on Pre-calculated button and the following screen will be displayed:

| Yequator | num of segments | Segment width | Angle |
|---|---|---|---|
| 0 | 13 | 1449 | 0 |
| 2524 | 7 | 1454 | 57.299 |
| 2958 | 5 | 886 | 80.45 |

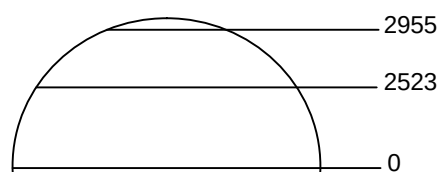
Yequator is the height of the joint between several rows of sections. On this case, there are only 2 rows of sections. The last height is the position of the previously calculated calota. (3000 – 45 = 2955).

N* of sections means the quantity of sections on each of the rows. On this case, there are 12 sections on the central row and 7 sections on the top row.

Always the closest rows to the Yequator = 0 consist of more sections for the same steel plate width.

3rd Step:

Standardize segments number.

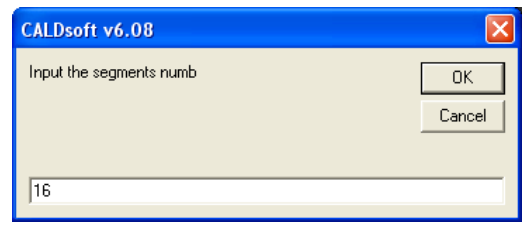


**Tip:**

It is normal to use a number of sections multiple of 4 so as to keep a structural symmetry for the vase and avoid coincidence of longwise welding.

Let's change the number of sections of the first row from 13 to 16, and the sections of the second row from 7 to 8.

Clicking on value 13 of the first list line, the following window will open: →

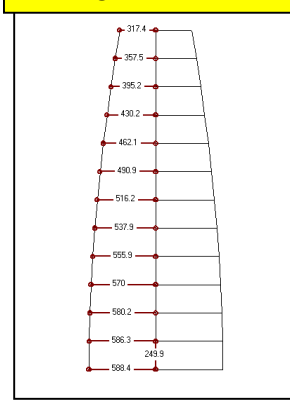


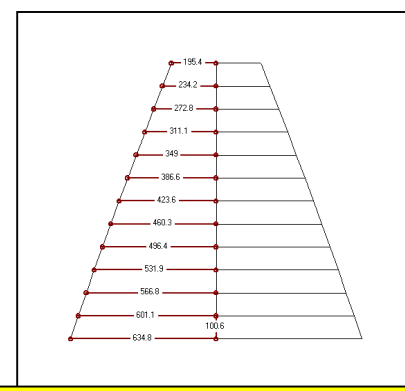

Entering the new value equal to 16, the table will display a new section width equal to 1176mm. The previous width with 13 sections was 1148mm. Considering that a 1500mm width plate is being used, less advantage is taken from such plate. However, a 1200mm width plate can be used.

| Yequator | num of segments | Segment width | Angle |
|---|---|---|---|
| 0 | 16 | 1177 | 0 |
| 2524 | 8 | 1272 | 57.3 |
| 2958 | | | 80.449 |

To change the second row, follow the same procedure.

**16 Segments of the first row**



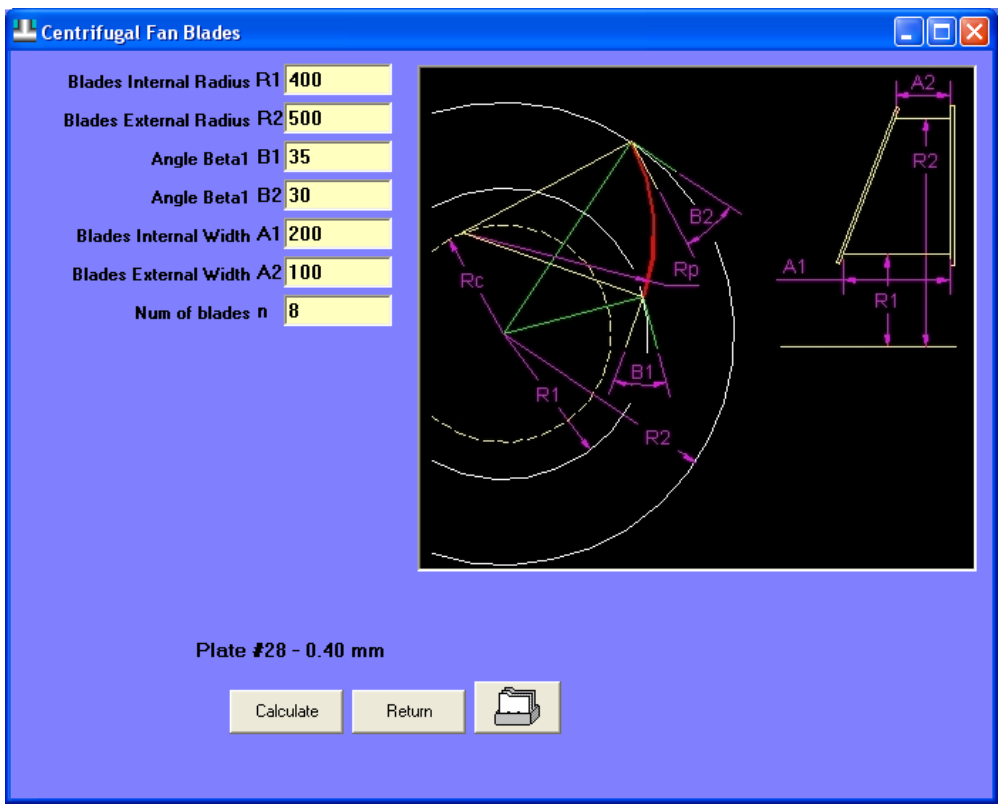




**8 Segments of the second row**

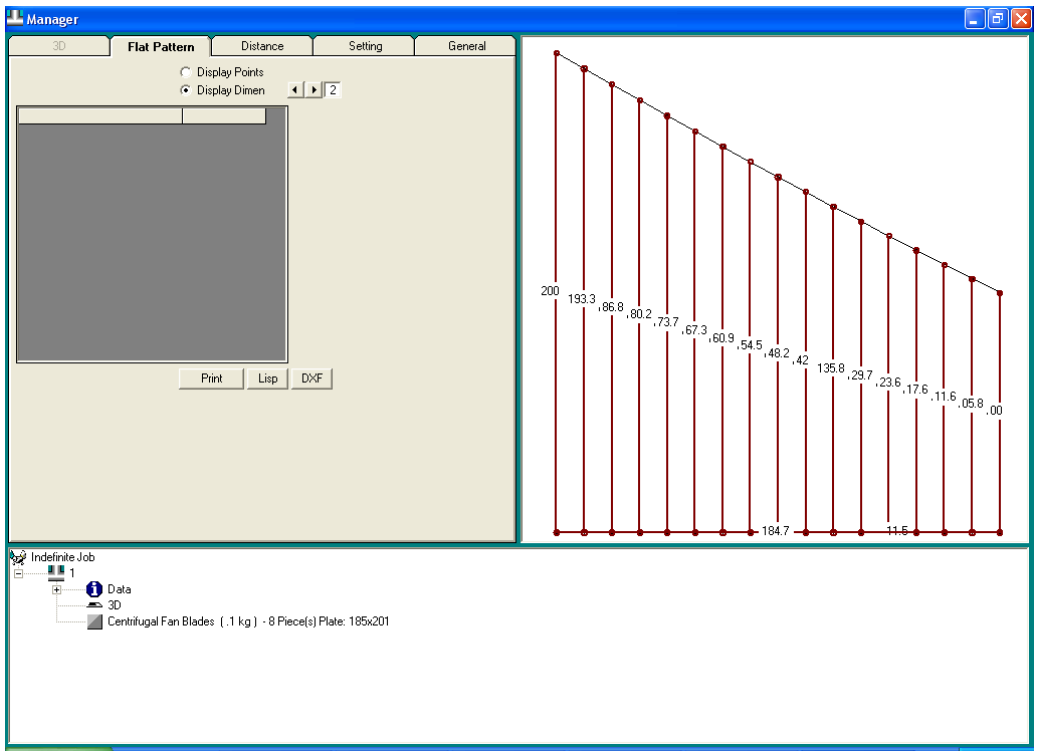
Now you just need to click on **Calculate** button...

- **Centrifugal fan blades**

| Variable | Values range | Notes |
|---|---|---|
| **R1** | Larger than 0 (zero) | Blade inside radius |
| **R2** | Larger than R1 | Blade outside radius |
| **B1** | Larger than 0 (zero) | Angle Beta 1 on the blade inlet |
| **B2** | Larger than 0 (zero) | Angle Beta 2 on the blade inlet |
| **A1** | Larger than 0 (zero) | Blade inside width |
| **A2** | Larger than 0 (zero) | Blade outside width |
| **n** | Larger than 0 (zero) | Number of blades |



## Flat pattern

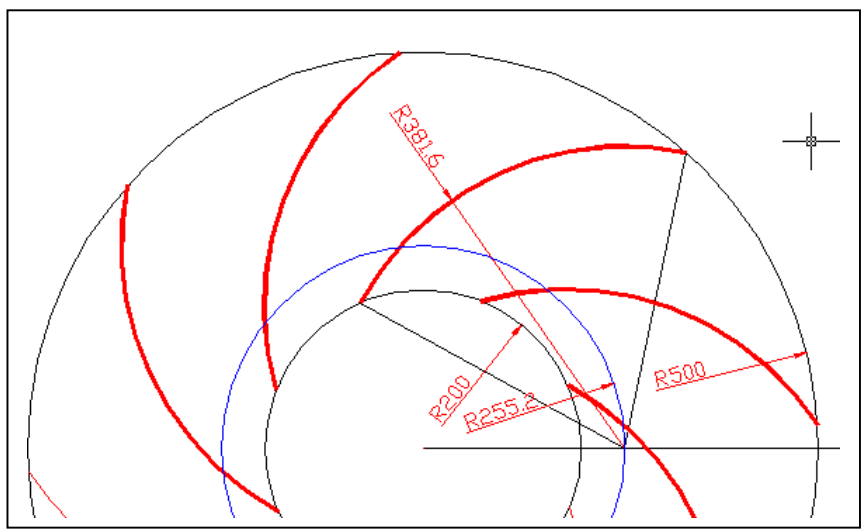



Use the two radiuses Rp and Rc to design the exact position of the blades on the rotor back plate.

Rc is the radius where the designing centers of the blades are placed, and Rp is the blade curve radius (also used on blade calendering)

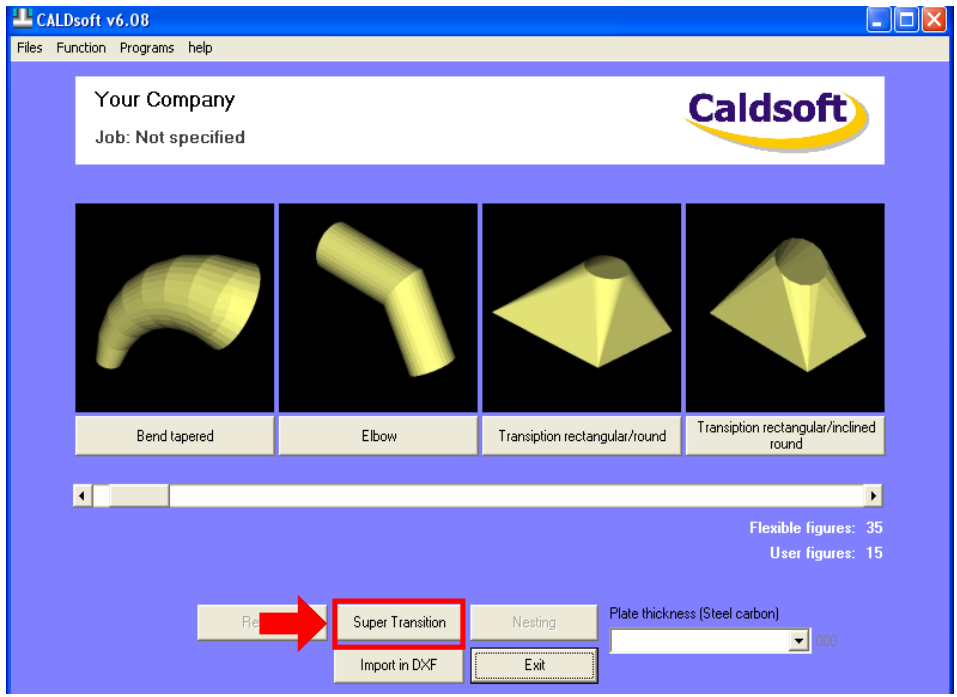
On the example below, data is as follows:

Rp = 381.6mm
Rc = 255.2mm
Blade inside radius = 200mm
Blade outside radius = 500mm
Number of blades = 8



- **Super Transition Module**

To start the Super Transition Module you need to click on the Super Transition button on the main Menu.




The piece dimensions must be informed on the entering screen, as per corresponding caption that is available on the figure at right.

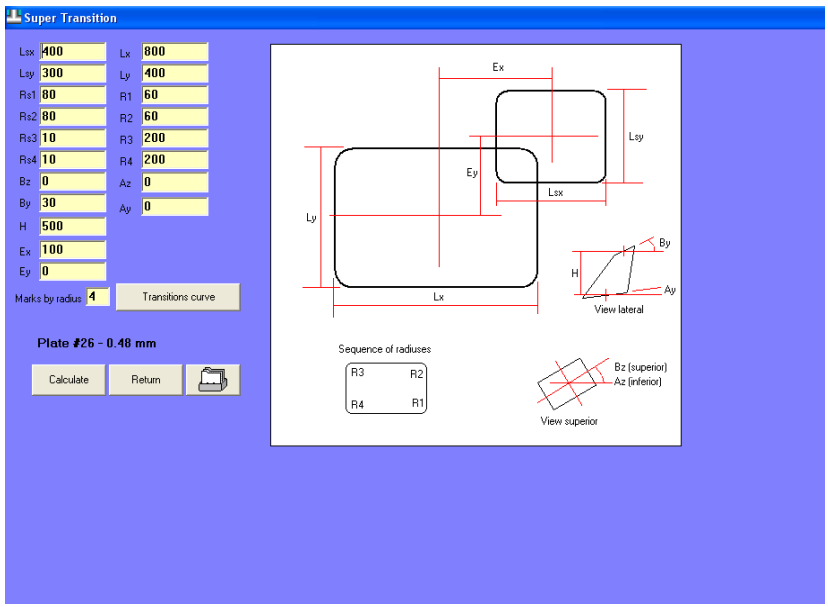
Note: All are considered outside dimensions.

All dimensions referred to bottom opening (section) are represented by variables Lx, Ly, R1, R2, R3, R4, Az and Ay.

While all dimensions referred to top opening (section) have e “s” suffix and are represented by variables Lxs, Lys, Rs1, Rs2, Rs3, Rs4, Az and Ay.

The center of the bottom section is fixed on the original coordinates (0, 0, 0), and the dimensions ex, ey and H define of the top section referred to the bottom section on the directions x, y, and z respectively.

With an exact arrangement of dimensions Lx, Ly and radius R1, R2, R3 and R4 it is possible to design rectangular, square, rectangular with round corners, oval and round sections.




Another feature of this module is that it allows to perform a special variable transition following a defined path. This can be done on the Curve Path Assistant – ST path, which must be performed from the main menu of CALDsoft on Programs / curve path Assistant.

After performing the curve path Assistant – Stpath, your result can be read on the CALDsoft by clicking on the Transition Curve button on the entering data screen of the Super Transition.

Curve Path Assistant – Stpath

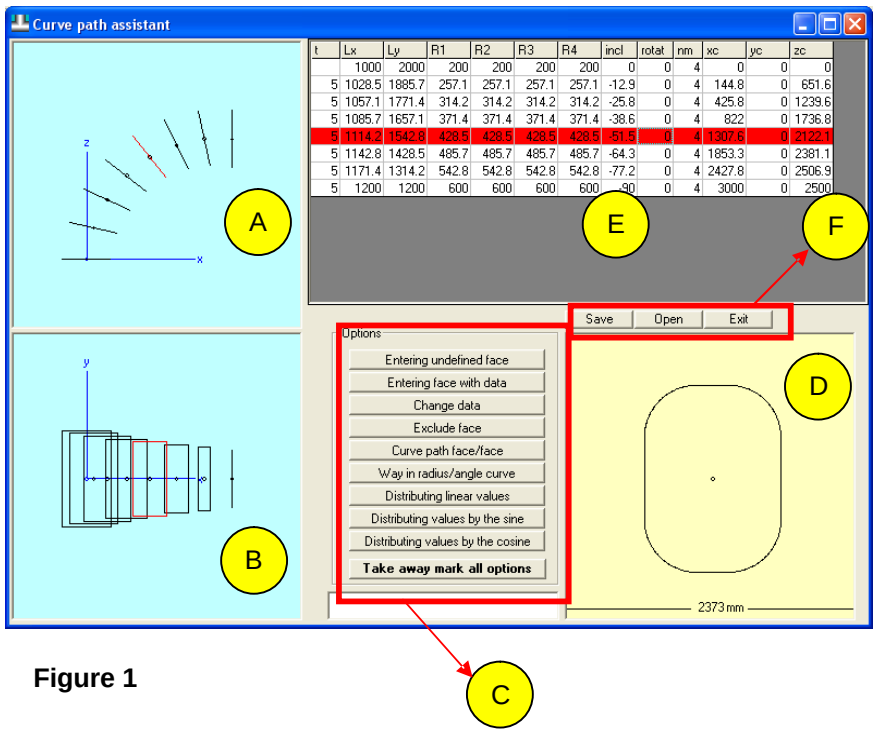



**Figure 1**

A – Side view of the space (on this window you will operate the zoom to magnify, reduce or move the 3D space view of the piece)

B – Top view of the space

C – Piece editing buttons

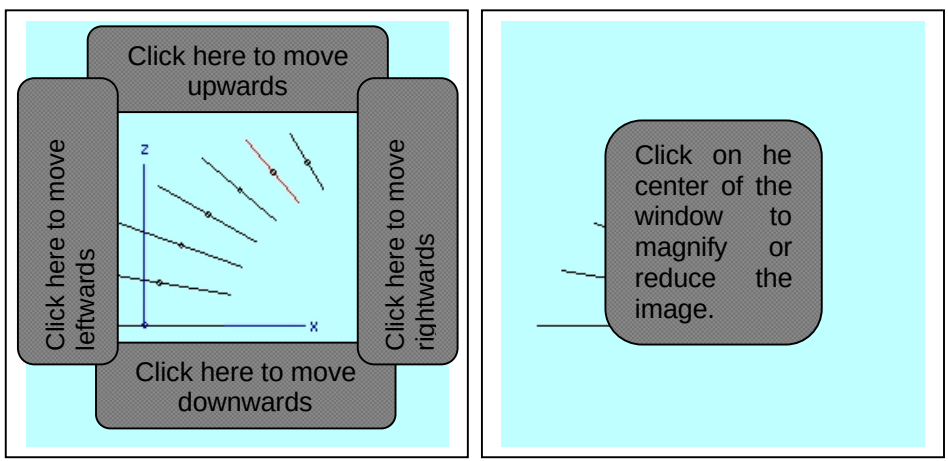
D – Detailed view of the selected section

E – Table with defined sections for the piece

F – Control buttons: save files, open files and exit from the program

Side view of the space (A on figure 1)

Mouse control to manipulate the view over the piece.


Click here to move upwards
Click here to move leftwards
Click here to move rightwards
Click here to move downwards
z
x
Click on he center of the window to magnify or reduce the image.

Note: Keep pressed mouse to accelerate the process

Click on the center of the window with the right or left button of the mouse respectively to magnify or reduce the image.

**Buttons**

**Entering undefined face**

When clicking on this button, the mouse pointer changes and requests you to click on the dimensions screen informing between which sections the new section must be entered. Considering it is undefined, this new section will be entered without values. However, these values must be informed ahead.

Note: The section will always be entered in the line below of the clicked section.

**Entering a face with data**

When clicking on this button, the mouse pointer changes and requests you to click on the dimensions screen informing between which sections the new section must be entered. On this moment, the dimensional data of the new section are required.

Note: The section will always be entered in the line below the clicked section.

**Changing data**

When clicking on this button, the mouse pointer changes and requests you to click on a specific cell on the dimensions screen in order to change the value of this screen. This input is also applied to enter blank lines, for example, when created by the **Inserting undefined face** button.

Note: When clicking on Change data button, this button will remain pressed up to the moment the **Take away mark all options** button is clicked. This operation can make the change of several cells of the dimensions screen at the same time easier.

**Excluding faces**

When clicking on this button, the mouse pointer changes and requests you to click on the dimensions screen informing which section must be eliminated.
Face/face curve path

When clicking on this button, the mouse pointer changes and requests you to click on the dimensions screen informing which will be the initial section of the path, and then clicking on the path final section. On this moment, the program will create all intermediate sections automatically, ensuring matching between initial and final selected sections.

Tip: Enter several blank sections (entering undefined face button) between initial and final section, hence ensuring the number of sections you wish for the piece.

For further information, see the example at the end of the section.

**Radius/Angle curve path**

When clicking on this button, the mouse pointer changes and requests you to click on the dimensions screen informing which will the initial of the curve path be and then clicking on the path final section you are requested to supply the Curve average radius and the total curve angle.
On this moment, the program will create all intermediate sections automatically, ensuring matching between initial and final selected sections, following the curve radius and informed angle.

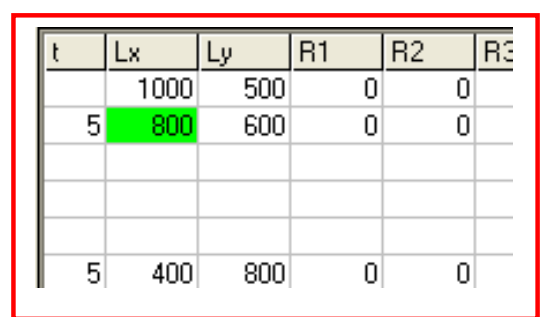
The number of sections created will be equal to the number of sections already entered between those two selected.

Tip: Enter several blank sections (entering undefined face button) between initial and final section, hence ensuring the number of sections you wish for the piece.

Distributing linear values
Distributing values by sine
Distributing values by cosine

When clicking on any of these buttons, the mouse pointer changes and requests you to click on the dimensions table informing the initial distribution cell and then clicking on final distribution screen. The automatic distribution of values will be determined by the selected option, where the linear option makes the distribution proportionally. The sine distribution smoothes the distribution of values near the final value, and the Cosine smoothes the distribution near the initial value.
See example below.

| t | Lx | Ly | R1 | R2 | R3 |
|---|---|---|---|---|---|
| | 1000 | 500 | 0 | 0 | |
| 5 | 800 | 600 | 0 | 0 | |
| | | | | | |
| | | | | | |
| | | | | | |
| 5 | 400 | 800 | 0 | 0 | |




Clicking on the “Distribute linear values” button and selecting initially the value of 8000 in the column Lx, the result is viewed below. The initial distribution value will be identified in green color.

Then clicking on the value 400 in the same Lx column, the automatic distribution between intermediate values will be made, as per table below:

| t | Lx | Ly | R1 | R2 | R3 |
|---|---|---|---|---|---|
| | 1000 | 500 | 0 | 0 | |
| 5 | 800 | 600 | 0 | 0 | |
| | 700 | | | | |
| | 600 | | | | |
| | 500 | | | | |
| 5 | 400 | 800 | 0 | 0 | |

**Values distributed proportionally**

If the distribution was made by Sine, we would then have the following result:

| t | Lx | Ly | R1 | R2 | R |
|---|---|---|---|---|---|
| | 1000 | 500 | 0 | 0 | |
| 5 | 800 | 600 | 0 | 0 | |
| | 646.9 | | | | |
| | 517.1 | | | | |
| | 430.4 | | | | |
| 5 | 400 | 800 | 0 | 0 | |

**Smoothed distribution on the final section**

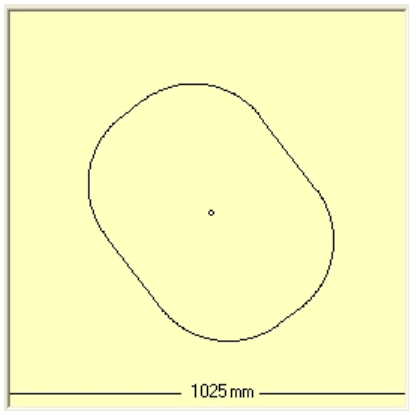
If the distribution was made by Cosine, we would then have the following result:

| t | Lx | Ly | R1 | R2 | R |
|---|---|---|---|---|---|
| | 1000 | 500 | 0 | 0 | |
| 5 | 800 | 600 | 0 | 0 | |
| | 769.5 | | | | |
| | 682.8 | | | | |
| | 553 | | | | |
| 5 | 400 | 800 | 0 | 0 | |

**Smoothed distribution on the initial section**

**Detailed view of the selected section (D in the figure 1)**

This window always shows the shape of the selected section. On the bottom part of the window, an average is displayed (1025mm, on the example) giving the size of the window in millimeters. Based on that, you can have an idea compared to the dimension of the section.




To magnify or reduce the image, you just need to click on the window with the right and left button of the mouse respectively

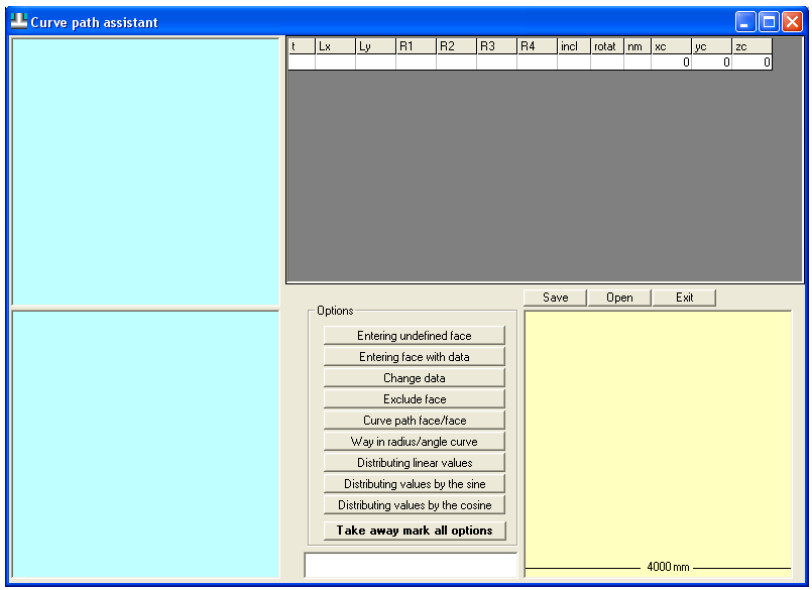
The selected section will be identified in red color.

| t | Lx | Ly | R1 | R2 | R3 | R4 | incl | rotat | nm | xc | yc | zc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 | 2000 | 200 | 200 | 200 | 200 | 0 | 37.5 | 4 | 0 | 0 | 0 |
| 5 | 1028.5 | 1885.7 | 257.1 | 257.1 | 257.1 | 257.1 | -12.9 | 37.5 | 4 | 144.8 | 0 | 651.6 |
| 5 | 1057.1 | 1771.4 | 314.2 | 314.2 | 314.2 | 314.2 | -25.8 | 37.5 | 4 | 425.8 | 0 | 1239.6 |
| 5 | 1085.7 | 1657.1 | 371.4 | 371.4 | 371.4 | 371.4 | -38.6 | 37.5 | 4 | 822 | 0 | 1736.8 |
| 5 | 1114.2 | 1542.8 | 428.5 | 428.5 | 428.5 | 428.5 | -51.5 | 37.5 | 4 | 1307.6 | 0 | 2122.1 |
| 5 | 1142.8 | 1428.5 | 485.7 | 485.7 | 485.7 | 485.7 | -64.3 | 37.5 | 4 | 1853.3 | 0 | 2381.1 |
| 5 | 500 | 666.6 | 216.6 | 216.6 | 216.6 | 216.6 | -50.1 | 37.5 | 4 | 2427.8 | 0 | 2506.9 |
| 5 | 1200 | 1200 | 600 | 600 | 600 | 600 | -90 | 37.5 | 4 | 3000 | 0 | 2500 |

**Example:**

Creating a transition automatically between two sections by using the options Face/face curve path and Distribute linear values.:

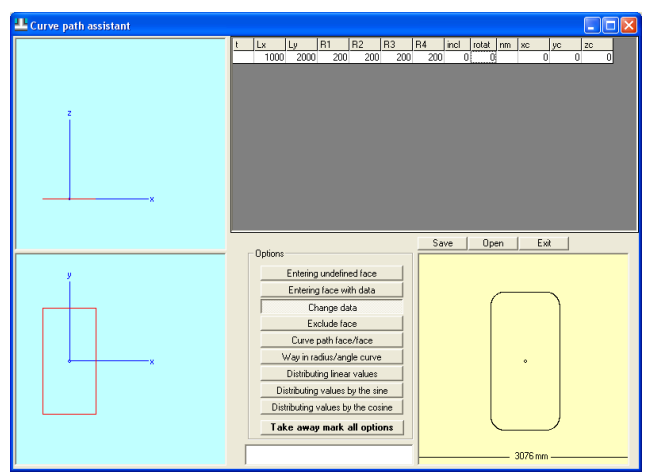
**Step 1** – Starting the Curve path Assistant - Stpath




**Step 2** – Entering the initial section dimensions

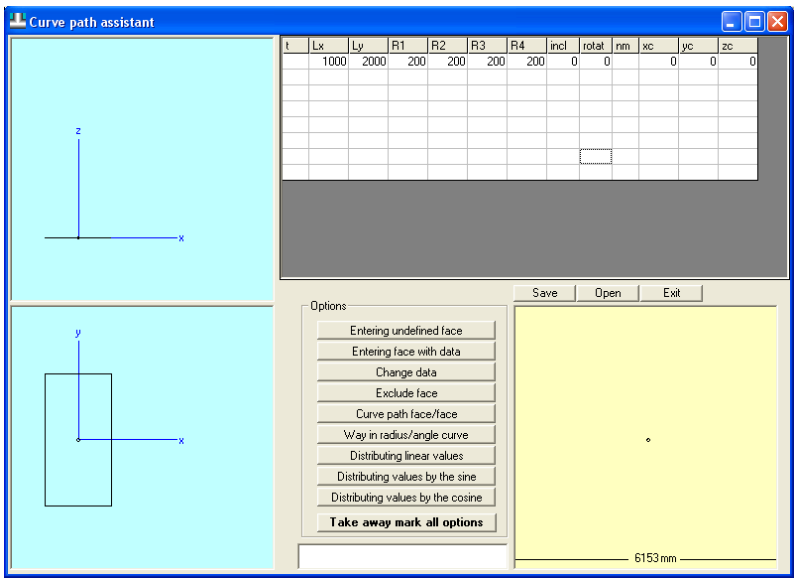
Clicking on the **Change data** button and then on empty cells, the values are added:

Lx = 1000 mm
Ly = 2000 mm
R1,R2,R3 and R4 = 200 mm
Inclination (incl) on the XZ plane = 0 degrees
Section rotation around its axis = 0 degrees



**Step 3** – Entering desired intermediate sections (without values)

Using the Entering undefined face option, 7 sections without values will be entered.

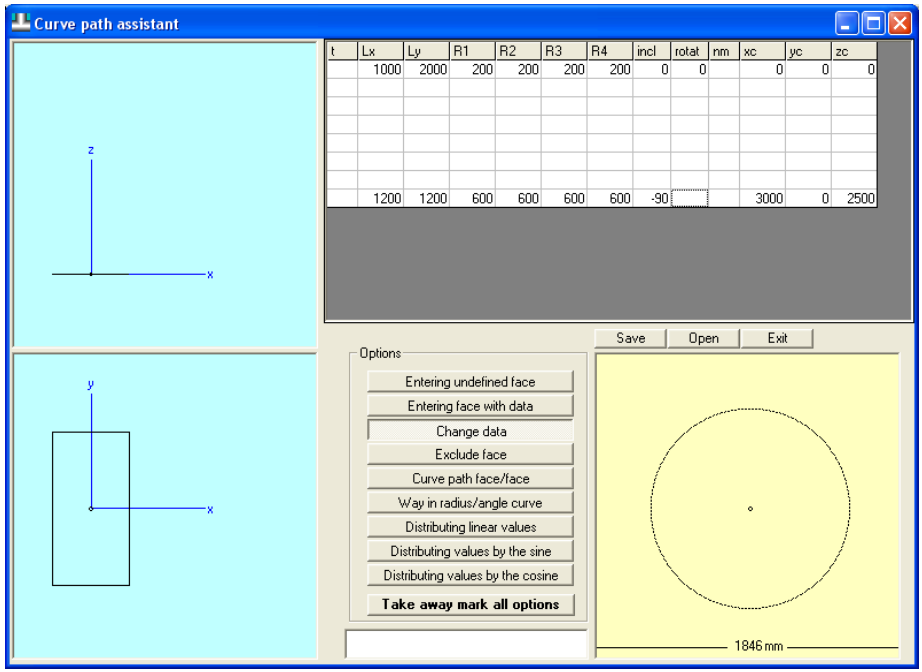



**Step 4** – Defining the final piece section

On the last empty line in the table, using the Change data option:

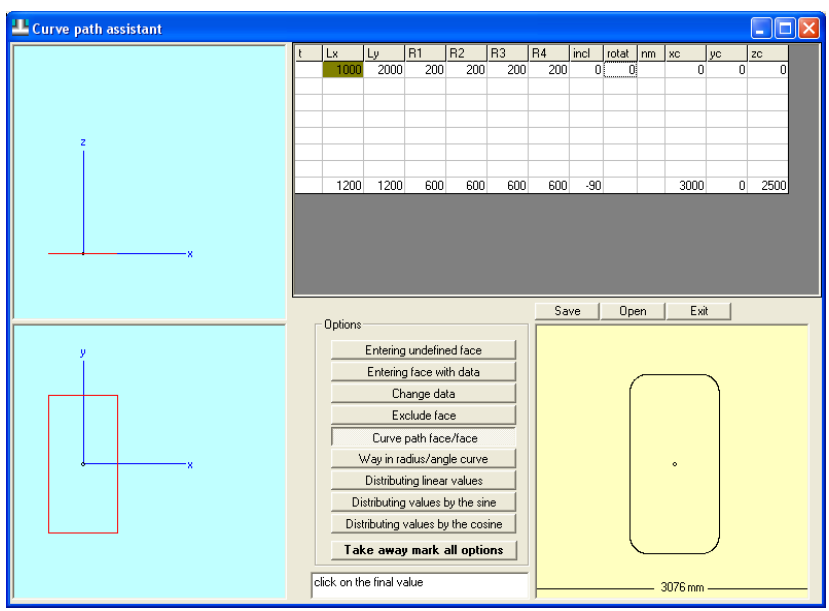
Lx = 1200mm
Ly = 1200mm
R1, R2, R3 and R4 = 600mm, to design a circular section.
Inclination (incl) on the XZ plane = - 90 degrees
Section rotation around its axis = 0 degrees
Space position of the center of this section: XC = 3000mm
YC = 0 mm
ZC = 2500 mm

Note: The 2 defined sections can be already displayed on the windows on the left. Use zoom options to adjust the view.

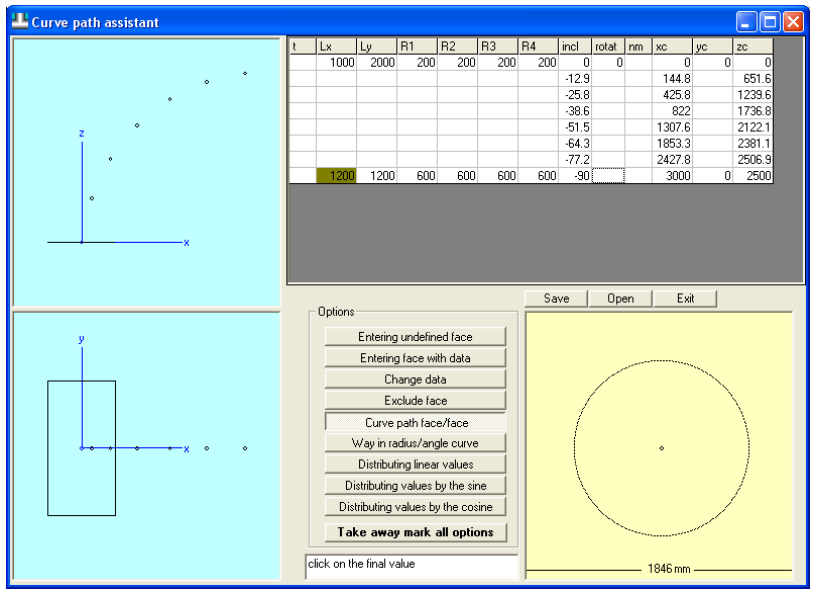



**Step 5** – Selecting sections

Clicking on the “Curve path face/face” button and selecting the first line in the table (initial section)



and then selecting the last line in the table (final section).



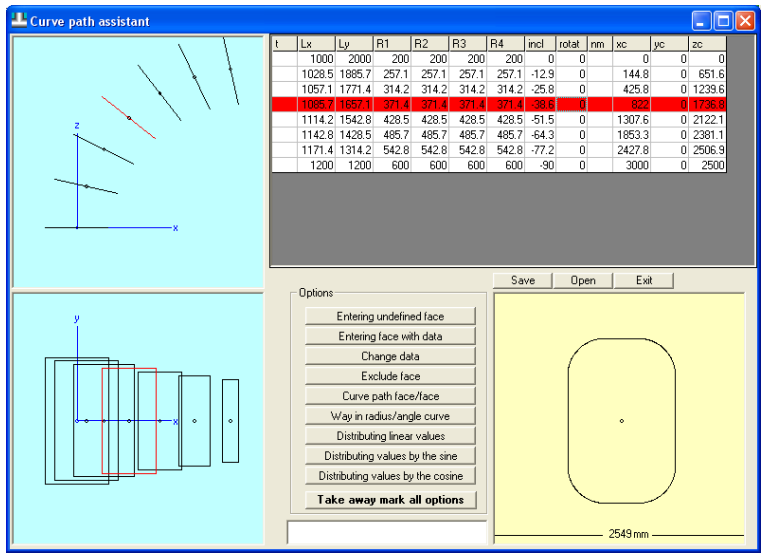

On this moment, points xc and zc of the center of each section are automatically calculated as well as the inclination (incl) of each section.

Note: the central points of each intermediate section can be already displayed on the windows on the left.

**Step 6** – Defining shapes for intermediate sections
For this example, let's consider the transition of the initial section (rectangular with round corners) for the final section (circle), being a proportional or linear transition. To do that, we will use the **Distribute linear values** option.
After clicking on **Distribute linear values,** we will select the value of 1000mm from column Lx and then the value of 1200mm from the same column. The result is displayed on the table below:

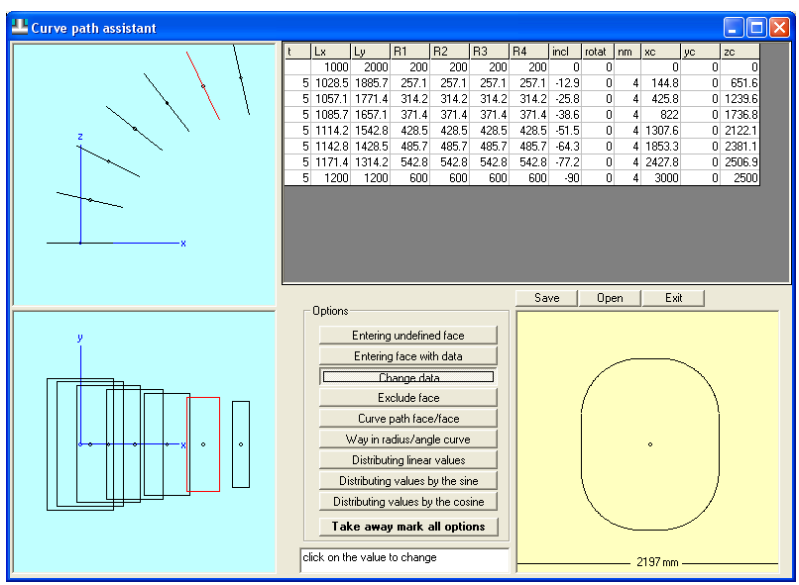
| t | Lx | Ly | R1 | R2 |
|---|---|---|---|---|
| | 1000 | 2000 | 200 | 200 |
| | 1028.5 | | | |
| | 1057.1 | | | |
| | 1085.7 | | | |
| | 1114.2 | | | |
| | 1142.8 | | | |
| | 1171.4 | | | |
| | 1200 | 1200 | 600 | 600 |

Following this procedure also for columns **Ly**, **R1**, **R2**, **R3**, **R4**, **incl**, **rotation** and **Yc**, we will have a complete distribution of the dimensions that define the intermediate sections.

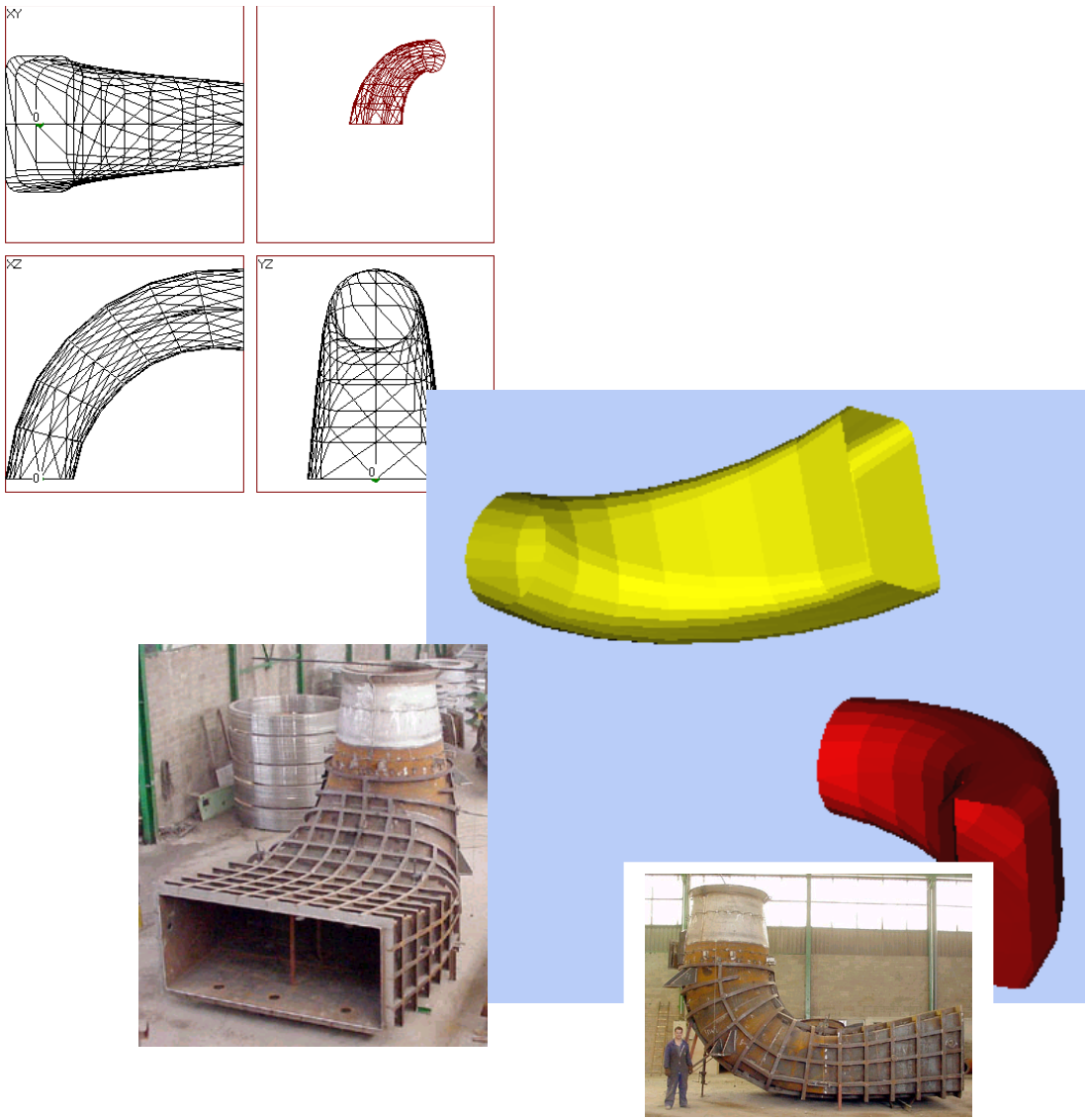



**Step 7** – Defining thickness and number of folding marks

Using the Change data option, section plate thickness and number of folding marks are entered. Different of the dimensions previously defined (Lx, Ly, R1, R2, R3, R4, incl, rotation and xc, yc and zc) which are different from section to section, the thickness values of the section plates and the number of folding marks are linked to each section (2 neighbor sections define 1 section).
This way, as pre-defined, the thickness values of the section plate and number of folding marks are always indicated on the line that corresponds to the final part of each section. So thickness values of the section plate and number of folding marks can not be included in the first table line.

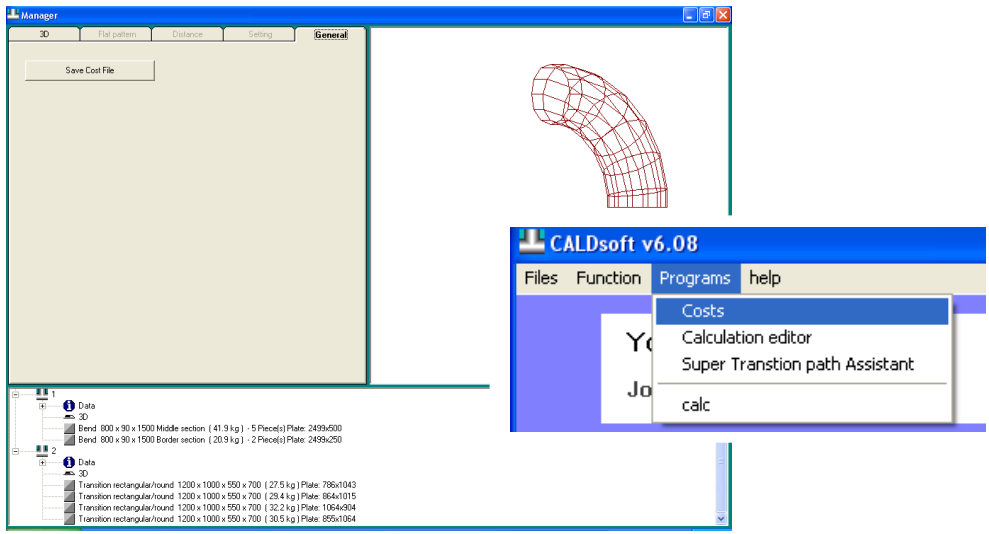


**Step 8** – Last step: Save the file and then open it in the CALDsoft6, on the Super Transition figure and on the Transition Curve button. To see the piece, click on the Results button.



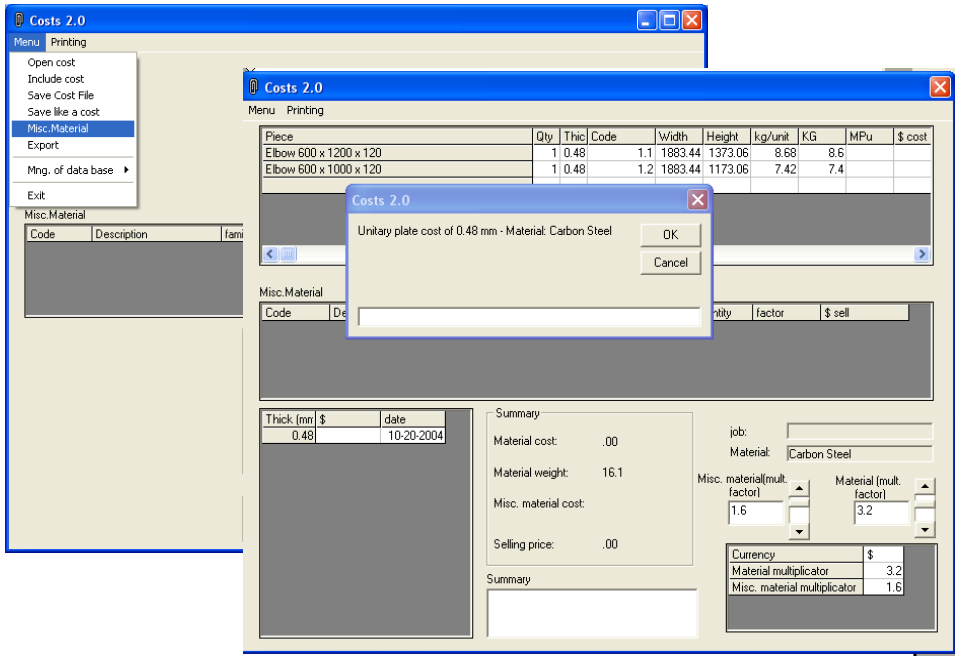
The module Costs has been designed to help your company when you need to budget a project (job).

First, let's open the CALDsoft and perform a few calculations allowing us the save the cost file.


Manager
3D
Flat pattern
Distance
Setting
General
Save Cost File
CALDsoft v6.08
Files
Function
Programs
help
Costs
Calculation editor
Super Transtion path Assistant
calc
Data
3D
Bend 800 x 90 x 1500 Middle section ( 41.9 kg ) - 5 Piece(s) Plate: 2499x500
Bend 800 x 90 x 1500 Border section ( 20.9 kg ) - 2 Piece(s) Plate: 2499x250
Data
3D
Transition rectangular/round 1200 x 1000 x 550 x 700 ( 27.5 kg ) Plate: 786x1043
Transition rectangular/round 1200 x 1000 x 550 x 700 ( 29.4 kg ) Plate: 864x1015
Transition rectangular/round 1200 x 1000 x 550 x 700 ( 32.2 kg ) Plate: 1064x804
Transition rectangular/round 1200 x 1000 x 550 x 700 ( 30.5 kg ) Plate: 855x1064

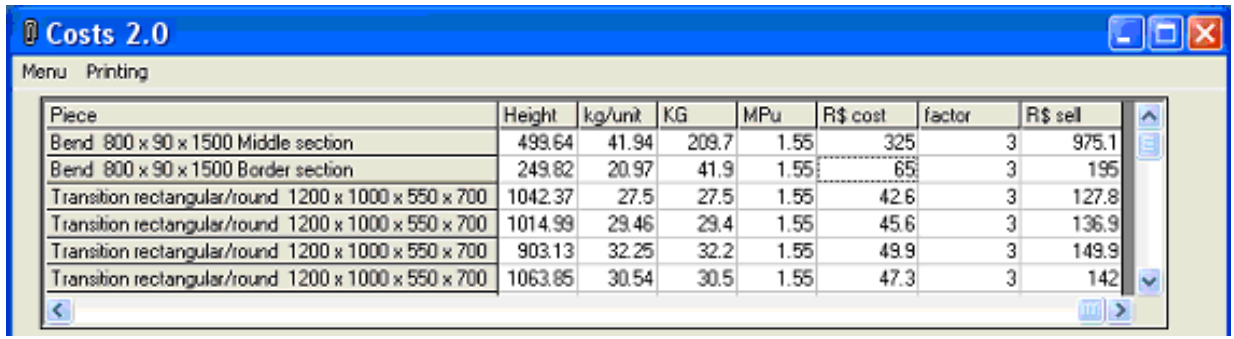
In order to save the cost file (extension *.cust), you just need to click on the "Save Cost File" button on the Manager screen, on the General toolbar. Choose a name for the file and then on the main screen of CALDsoft6, on the Program / Costs menu, the Cost program will be run.

In the Costs program, on the Open Cost menu locate the file that was saved previously to open it. When opening this file, the program will automatically request the unit cost (by Kg) for the steel plates being used on the flat patterns (type of material and thickness are herewith considered). Once the value has been informed first time, the program will save such information in the data bank and you do not need to supply it second time.
How to update your data bank periodically (for example, when there is a cost increase on the raw material) it will be described ahead.




On the top table, the following data is displayed:

| | |
|---|---|
| **Piece** | Piece description |
| **Quantity** | Piece quantity |
| **Space** | Piece thickness |
| **Code** | Code informed in the CALD |
| **Width** | Minimum width of the plate to cut the piece |
| **Height** | Minimum height of the plate to cut the piece |
| **Kg/unit** | Unit weight of the piece |
| **Kg** | Total weight for all parts (Kg/unit x Quantity) |
| **MPu** | Unit cost plate material ($/kg) |
| **$ cost** | Total cost |
| **Factor** | Multiplying factor applied in your company (taxes, fixed costs, profit, etc) |
| **$ sale** | Selling price ($ cost x factor) |

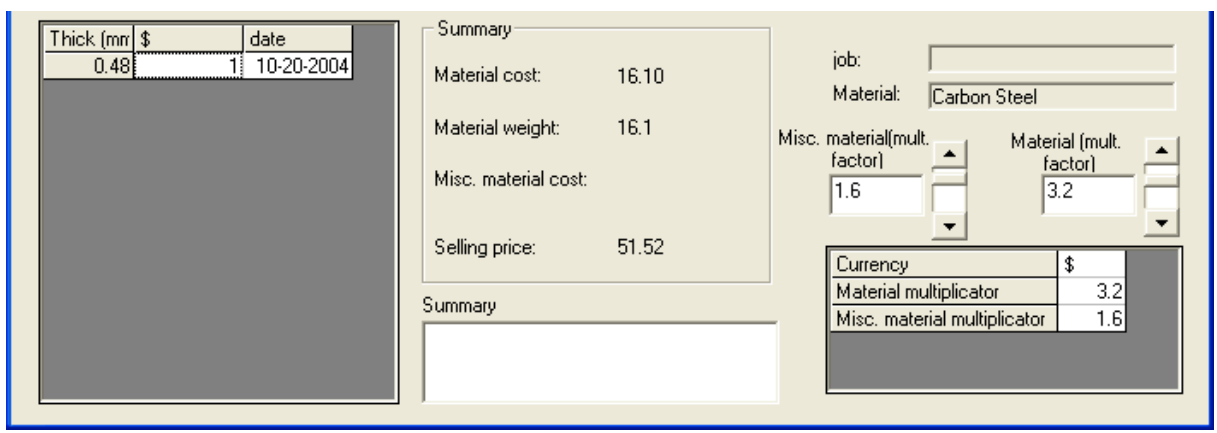



The table with unit cost for plate material in R$/Kg and the date of the latest price update is available on the bottom left part of the screen.

To change the cost unit value of the plate material, you just need to click on **value** option on the screen. This change will be used as from this date to the next performed calculations.

In order to perform the cost, the program uses a multiplying factor (you should create your own based on the commercial policy of your company), which may be dynamically changed, by using the arrows. When changing the multiplying factor, all pieces will be automatically recalculated. When changing the multiplying factor, this change will only apply to the current budget. To definitively change the multiplying factor, click on it on the table (bottom right corner). This change will only be applied to the next calculations that will be performed.

**Selling price summary:**



On the example, the total gross weight of the flat patterns is 471.7 Kg, and the unit cost of the 4.8mm steel plate used was informed as being $ 1.55/ Kg. The multiplying factor used by the company is 3. Therefore, the material cost will be:

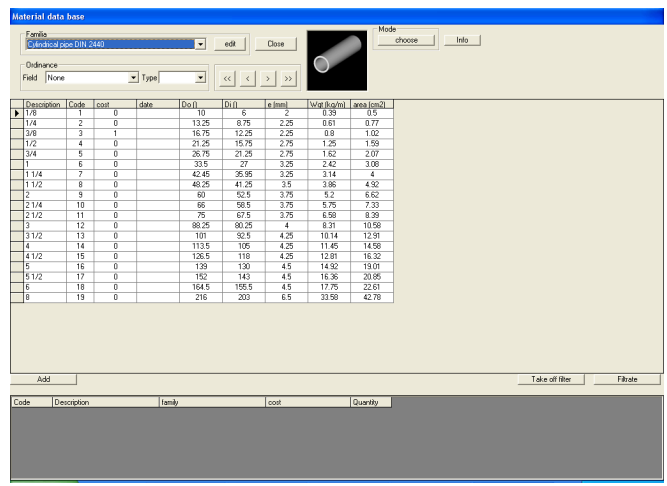
Material cost = 471.7 x 1.55 = $ 731.14 (without applying the multiplying factor)

Selling price = 731.14 x 3 = $ 2193.41 (applying the multiplying factor)

Notice that on the example, the misc. material cost is zero once no misc. material was used other than the flat patterns. If on your budget any different material was used (besides the flat patterns) such as corners and bolts, you would have to select these misc. materials to have them included. Let's include 30Kg of corner 1 ½" x 3/16".

**Selecting different raw materials**

On the **Menu / Misc.Materials** option, you will enter in the configurable data bank of materials. There are some materials already included. However, you need to register the mostly used materials in your company. In order to include the type of material you wish to include, select on the available ones on the Family option, on the top left corner of the screen.
To include the desired material, click on it on the screen and then click on Add button on the bottom left corner.




On this moment, the program will select the quantity of such material being used. You must inform the quantity applying same unit used when the cost of this material was registered. For example, for the corner used on our example, the quantity is informed in Kg (30Kg) and the unit cost of the corner is $ 2.10 / Kg.

**IMPORTANT:** As applied to the whole program, these values must be spaced by dot ( . ) instead of comma ( , ).

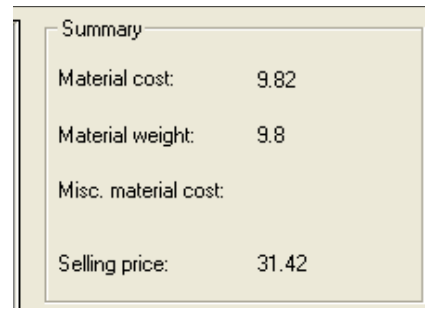
To return to the summary of costs, click on **Close** button. Corner costs are now included.

Misc. material cost = 30 x 2.10 = R$ 63.00

The misc. material multiplying factor is 1.6 (register yours based on the commercial policy of your company).

On the example, the selling price is then:

Price = 731.14 x 3 + 63.00 x 1.6 = 2294.21




**Tips**:

- To change any value in the table of the flat patterns, you just need to click on the value that you wish the have it changed.
- To exclude any flat pattern, click on the Select line option and then click on the flat pattern line that you wish to have it excluded. Click again on the line with the right button of the mouse.
- To include more CALDsoft6 calculations (other flat patterns), you just need to include the new cost file into the current one by using the Include cost option on the Menu.
- Use the Summary option on the bottom part of the screen to enter any information that you wish to have into the budget to be performed.
- To change the unit value of the materials (for example, when there is an increase an increase of raw material cost), click on them on the respective screens.

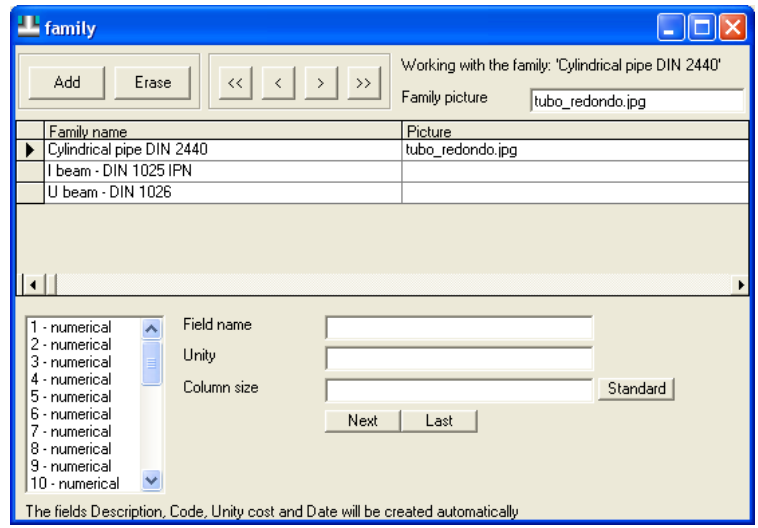
**Creating tables of different Miscellaneous Materials**

You may create a new family of misc. material. To do that, go to Menu / Misc.Materials and then click on the Selection button (in the Mode area). This button will be described as Edition. On this moment, you may:

**Add** a new material into the current family;
**Exclude** the selected material;
Change any values in the table by clicking on the desired value and then type it.
If you do not wish to include the materials, one by one, you then can import them from an existing table. For example, from Microsoft Excel. This will be described ahead.

To change, exclude or add a new family of raw material, click on Edit on the side of the family selecting area.

Select the desired family with the arrows or clicking on the table. Then click on delete button to have it excluded. If you wish to include a new family, click on add. Select the family name (for example, flat washer). Notice that a new line was created on the table with the new family name. You may type on the Figure column the name of the image file (JPG or BMP) of the misc. material that has been just created. This figure must be included into the Figures file of CALDsoft6.




Select on the bottom left list the numeric fields (1 to 25) and the text fields (26 to 28), which will make part of the new misc. material. On the flat washer example, we can create three numerical fields including the following information:

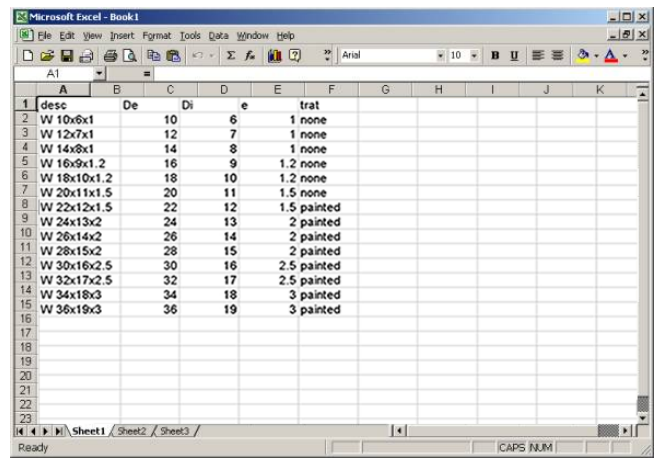
| | | |
|---|---|---|
| 1-Numeric – | Field name: | De (Washer outside diameter) |
| | Unit: | mm |
| | Column size: | 1000 (standard value of the column width) |
| 2-Numeric – | Field name: | Di (Washer inside diameter – hole diameter) |
| | Unit: | mm |
| | Column size: | 1000 (standard value of the column width) |
| 3-Numeric – | Field name: | esp (Washer Thickness) |
| | Unit: | mm |
| | Column size: | 1000 (standard value of the column width) |
| 26-Text – | Field name: | Treat. (Washer surface treatment) |
| | Unit: | it is not applied to text fields |
| | Column size: | 1000 (standard value of the column width) |

Now you just need to close the screen and the Flat washer family is then created. To enter the washers, you need to add a new material into the current family, as explained previously.

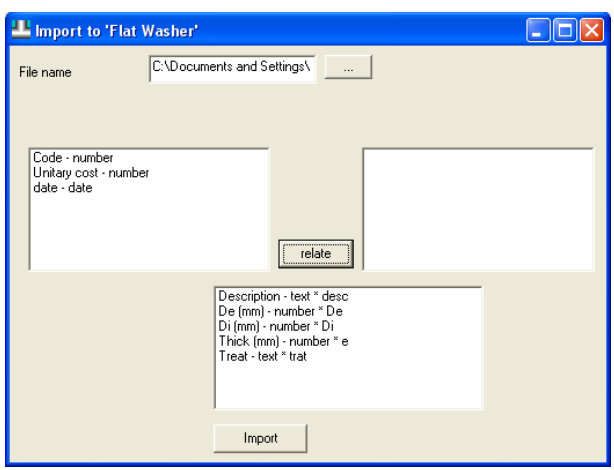
**Importing an existing table**

Let's suppose that the table of the washer dimensions is already available (or you prefer to create) on the Excel.

First you need to create a family as described previously, informing the 3 numeric fields (De, Di and Esp) and text field Treat. Open the Excel file that contains the data and then "Save as" this plane sheet on the "text (separated by tabs) (*.txt)" format. Now on Costs, go to Menu / Misc.Materials and click on Selection button (on the Mode area). This button will be described as Edition. Select the Flat Washer family and then click on Import button.




| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | desc | De | Di | e | trat | |
| 2 | W 10x6x1 | 10 | 6 | 1 | none | |
| 3 | W 12x7x1 | 12 | 7 | 1 | none | |
| 4 | W 14x8x1 | 14 | 8 | 1 | none | |
| 5 | W 16x9x1.2 | 16 | 9 | 1.2 | none | |
| 6 | W 18x10x1.2 | 18 | 10 | 1.2 | none | |
| 7 | W 20x11x1.5 | 20 | 11 | 1.5 | none | |
| 8 | W 22x12x1.5 | 22 | 12 | 1.5 | painted | |
| 9 | W 24x13x2 | 24 | 13 | 2 | painted | |
| 10 | W 26x14x2 | 26 | 14 | 2 | painted | |
| 11 | W 28x15x2 | 28 | 15 | 2 | painted | |
| 12 | W 30x16x2.5 | 30 | 16 | 2.5 | painted | |
| 13 | W 32x17x2.5 | 32 | 17 | 2.5 | painted | |
| 14 | W 34x18x3 | 34 | 18 | 3 | painted | |
| 15 | W 36x19x3 | 36 | 19 | 3 | painted | |




Select the file you have exported into the Excel (Flat washer.TXT) and make the relations between the fields that are available on the new family that you created with the corresponding Excel table fields. Then click on the import button.

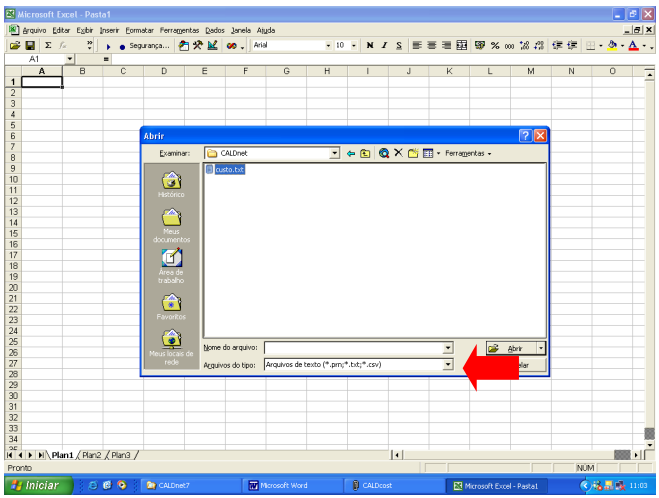
Tip: you may use another program to export the table as "text separated by tabs". Additionally, the data bank already available in your company can do this for you. Contact your IT personnel.

## Exporting your calculation into Excel and Word

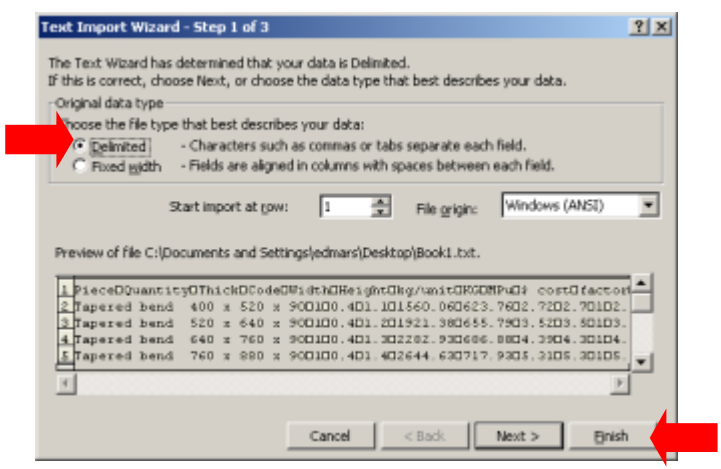
### Using Microsoft EXCEL

To export a cost file into Excel, you just need to click on Menu / Export and save the file.

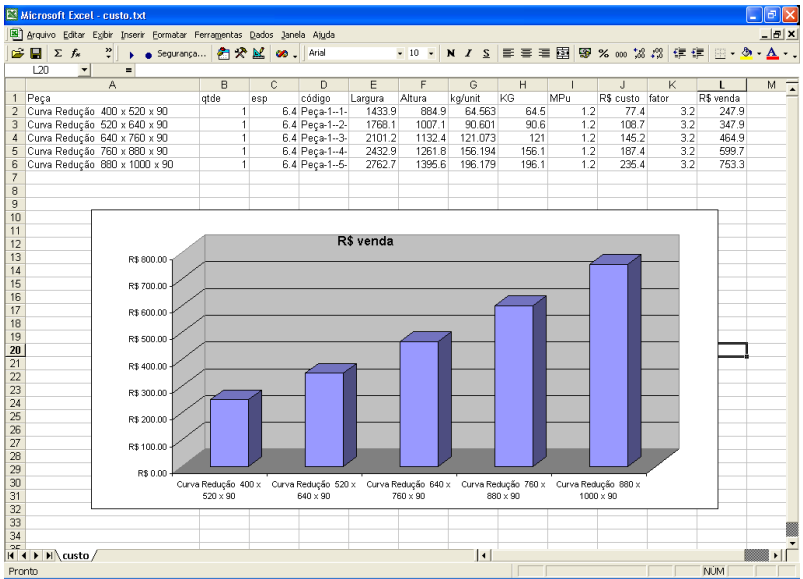
When running the Excel, open the file as **text file.**



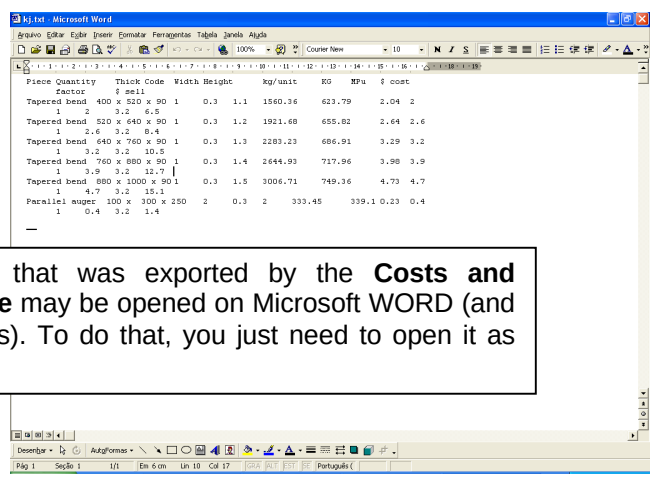

Once the file has been located, click on Open. A window will be displayed by the Excel, as shown below. Check if the Delimited option is selected and then click on Conclude.


Text Import Wizard - Step 1 of 3
The Text Wizard has determined that your data is Delimited.
If this is correct, choose Next, or choose the data type that best describes your data.
Original data type
Choose the file type that best describes your data:
Delimited - Characters such as commas or tabs separate each field.
Fixed width - Fields are aligned in columns with spaces between each field.
Start import at row:
File origin:
Windows (ANSI)
Preview of file C:\Documents and Settings\jedmars\Desktop\Book1.txt.
Cancel
< Back
Next >
Finish

When opening the file on Excel, you will have the possibility to perform other calculations, create provisions and graphics.



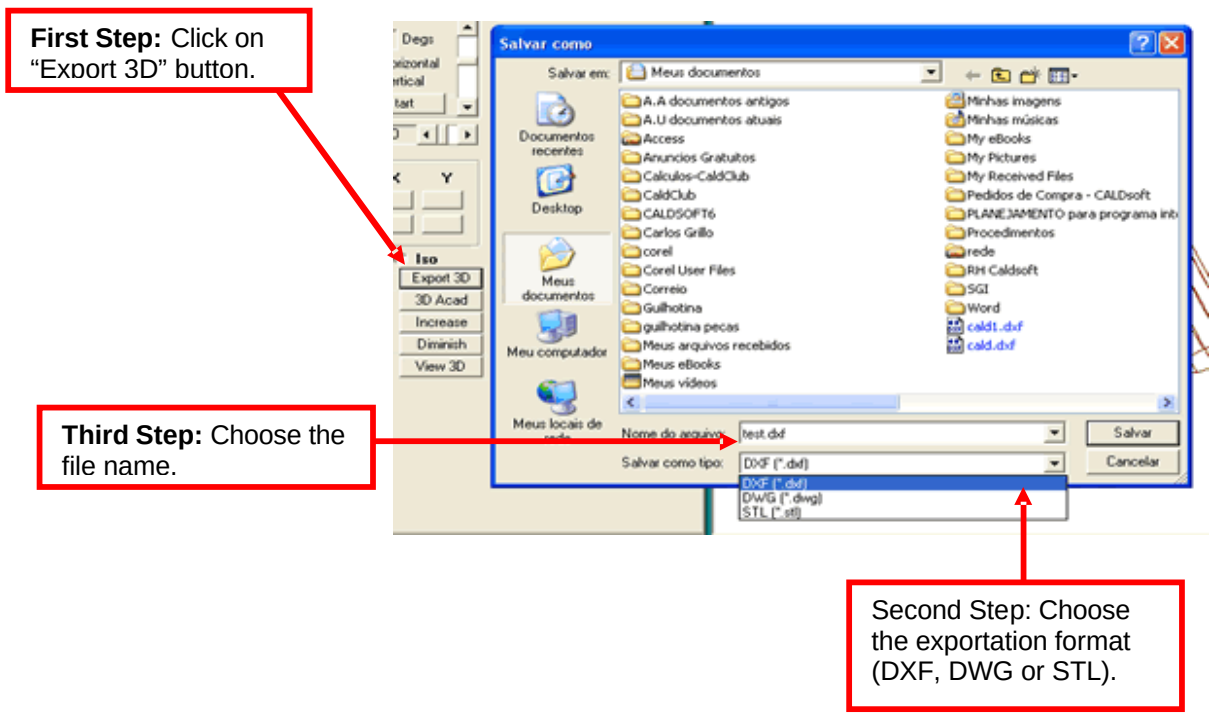

Using Microsoft WORD




This same file that was exported by the **Costs and Budgets Module** may be opened on Microsoft WORD (and other text editors). To do that, you just need to open it as text file (txt).

- **Exporting the piece in 3D DXF, DWG or STL:**

To export a calculated 3D piece by CALDsoft just view the 3D of the wished piece and click on “Export 3D” button (First Step). After to click on this button will open a screen askind two informations, that are: which kind of file you wish to save (standard is DXF) and the name of the file (these are the second and third step).




What each kind of files are?

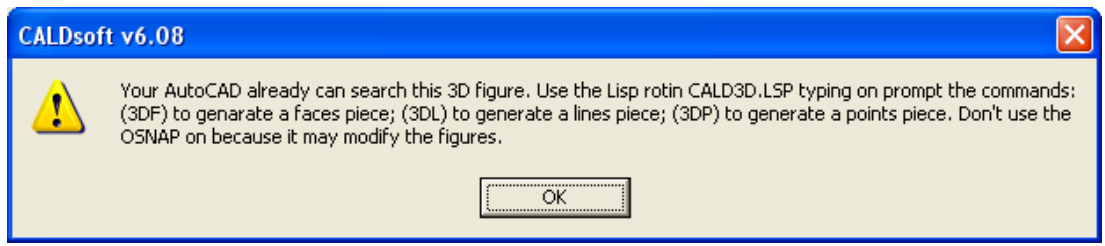
DXF – standard file of CAD programs
DWG – standard file use for the AutoCAD
STL – file supported by commercial 3D programs (ex.: SolidWorks) and a infinity of free viewers.

IMPORTANT: DXF and DWG files are exported usind the format R14 (AutoCAD R14).

- **Exporting a 3D piece – LISP:**

To export a piece in 3D interface into AutoCAD, click on the 3D Acad button on the 3D toolbar of the Manager. The piece that is being viewed will be opened by the AutoCAD through **LISP** routines.

The following message will be displayed:


CALDsoft v6.08
Your AutoCAD already can search this 3D figure. Use the Lisp rotin CALD3D.LSP typing on prompt the commands: (3DF) to genarate a faces piece; (3DL) to generate a lines piece; (3DP) to generate a points piece. Don't use the OSNAP on because it may modify the figures.
OK

On this moment you already can open the AutoCAD. Click on the Load Application menu..., or load it from the control line by typing appload.

Now click on the **File** button... and load the **CALD3D.LSP** file, locating on the main directory of the **CALD** program. Then click on **Load** button.

**IMPORTANT:**

Before running the routines, you need to disability the **AutoSnap**. On the TOOLS menu select **Object Snap** Settings and then click on the **Clear all** button, or clicking twice on the button toolbar of the ***AutoCAD*** on the OSNP option, leaving it disabilities.

On the control toolbar of the AutoCAD, type:

- **3DF** in parenthesis: **(3df)**
  To generate the piece with faces;
- **3DL** in parenthesis: **(3dl)**
  To generate the piece with lines;
- **3DP** in parenthesis: **(3dp)**
  To generate the piece with points.

Followed by **Enter** or **Space Bar** key.

- **Exporting flat patterns into CAD – DXF or DWG:**

On the Planif toolbar, clicking on the Export button: you save the flat pattern on DXF or DWG interface. DXF is a universal file, that is, the majority of the CAD programs can read this file such as AutoCAD, Microstation, TurboCAD, among others. But the DWG file is the standard of AutoCAD. The flat pattern saved on DXF will be on 1:1 relation and without dimensions, which makes the CNC machine setting easier.

- **Exporting the flat patterns into AutoCAD quickly – LISP:**

When clicking on DXF button of the previous item, a temporary file (c:/x) will be created and AutoCAD can read it through **LISP** routines

When entering the **AutoCAD**, click on the Load Application menu..., or load it from the control line by clicking **appload.**

Now click on the File button... and load CALD.LSP file, available on the main menu of **CALD** program. Then click on **Load** button.
On the AutoCAD control bar type letter c in parenthesis: (c) . Then click on Enter or Space Bar option.

The design of the calculated piece will be added to your current design.

IMPORTANT: Disability of AutoSnap on the AutoCAD. On the **TOOLS** menu, select **Objects Snap Settings** and click on **Clear all** button, or click twice on the bottom bar of the AutoCAD, on the OSNAP option, leaving disabilities.

**Creating a quick access menu on AutoCAD**

You can include a control line on the AutoCAD menu to access directly the ***CALDsoft*** program, avoiding to type the steps described previously. To include an access line into the AutoCAD menu, you need to open the **ACAD.MNU** file with any text editor. If your Autocad is already fitted with customized menus, then you need to open the standard **.MNU** file of your section or company.

The **ACAD.MNU** file is a text file that has the information about the functions available on the **AutoCAD** menu. After changing this file, you must always save it as **Document text**, format of **MS-DOS**, with the original extension **MNU.**

1º Step:

Open the ACAD.MNU file with any text editor. This file must be available on the main AutoCAD menu, on the SUPPORT file.

Locate in the file the part that defines the Pop's menus (top bar menus) On the POP1 on **FILE you will find the controls of the FILE menu (New, Open, Save, Save as, Export, etc.), as shown on the example.

```
.***POP1
**FILE
ID_MnFile     [&File]
ID_New        [&New...\tCtrl+N]^C^C_new
ID_Open       [&Open...\tCtrl+O]^C^C_open
              [--]
ID_Save       [&Save\tCtrl+S]^C^C_qsave
ID_Saveas     [Save &As...]^C^C_saveas
ID_Export     [&Export...]^C^C_export
              [--]
ID_Config     [P&rinter Setup...]^C^C_config
```

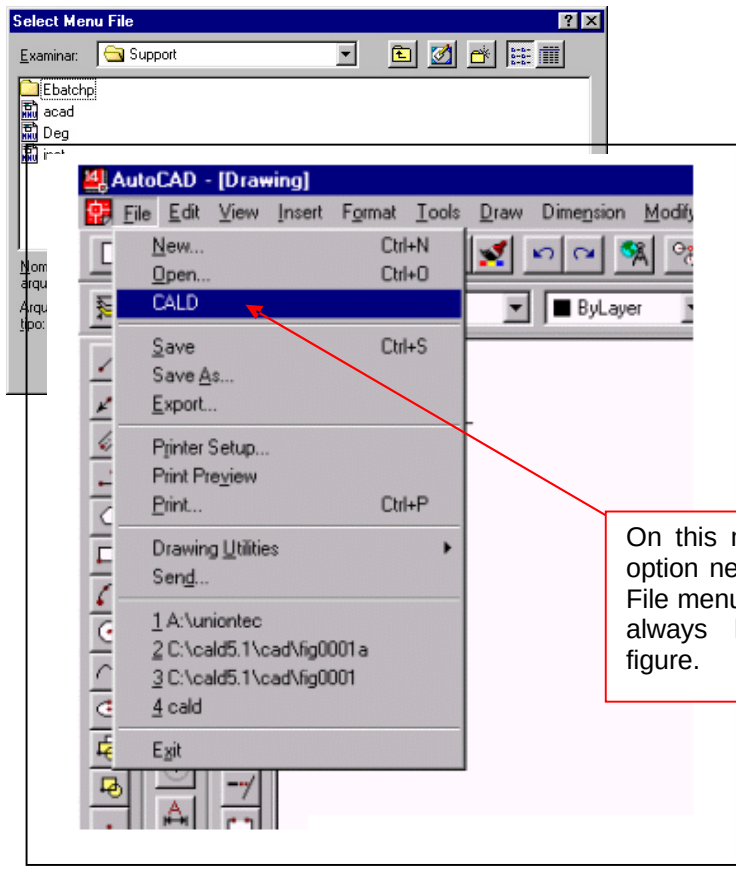
You need to add a line below the Open control bar (it can be on another area, if you prefer), with the flowing functions.

[Text displayed]^C^C (Load"path+cald.lsp") (c )

```
[CALD]^C^C(Load"c:/Programs and files/
CALDsoft/cald.lsp")(c)
```

```
***POP1
**FILE
ID_MnFile     [&File]
ID_New        [&New...\tCtrl+N]^C^C_new
ID_Open       [&Open...\tCtrl+O]^C^C_open
[CALD]^C^C(load"c:/Programs and files/CALDsoft/cald.lsp")(c)
              [--]
ID_Save       [&Save\tCtrl+S]^C^C_qsave
ID_Saveas     [Save &As...]^C^C_saveas
ID_Export     [&Export...]^C^C_export
              [--]
ID_Config     [P&rinter Setup...]^C^C_config
```

Run the AutoCAD and type MENU to load the change and compile the ACAD.MNU file on ACAD.MNS




Select on the F**ile** option the extension (*.mnu) to locate the **MENU.MNU** file and then select it.

Click on **Open** or **OK.**

And on the next window, click on **Yes** or **OK.**

On this moment, a line with **CALD** option needs to be included into the File menu of the AutoCAD, which will always locate the last exported figure.

**Note:** Use the menus programming resources to turn automatic other activities on the AutoCAD. To do that, check the manuals of your program or the Autodesk distributors of your region.

www.autodesk.com

- **Exporting the flat patterns into MicroStation quickly:**

When you are viewing a flat pattern on CALDsoft it is already able to be open by MicroStation. To view this flat pattern on MicroStation just open the MicroStation, click on menu **Utilities / Macro / MicroStation BASIC.**

Now, click on **Browse** button… and load the **CALDSOFT.bas** file, located on main directory of **CALDsoft** program (where CALDsoft is installed). And after, click on **RUN** button.

The draw of the calculated piece will be added on your current draw.

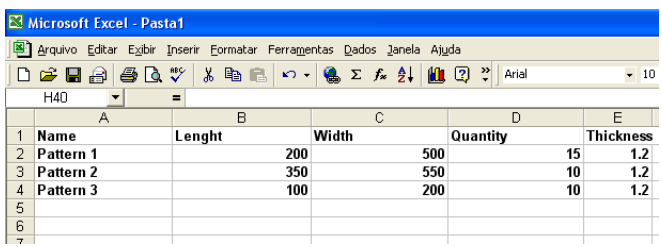
There are two ways to import flat patterns with CALDsfot. The first is to **Import retangular flat patterns of tabulated text files**. The second is **Import flat patterns of DXF or DWG files**.

On sequence of this chapter, these kind of importations will be explaned.

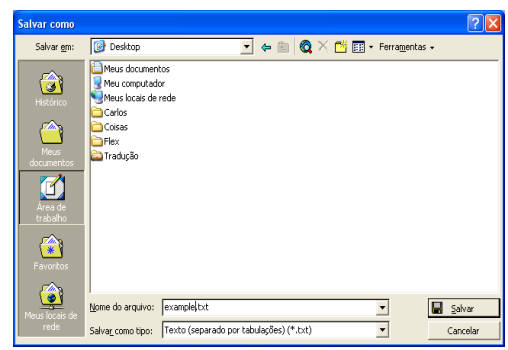
- **Importing rectangular flat pattern form text tab files:**

CALDsoft can also import rectangular drawings done in a .txt file or even in EXCEL (As long as the file is saved as “separated by tabs”).

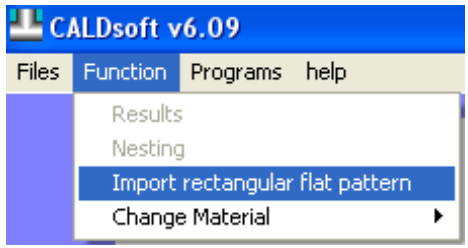
To do this, just create your measures using the fields: name of the flat pattern, length, width, quantity and thickness.

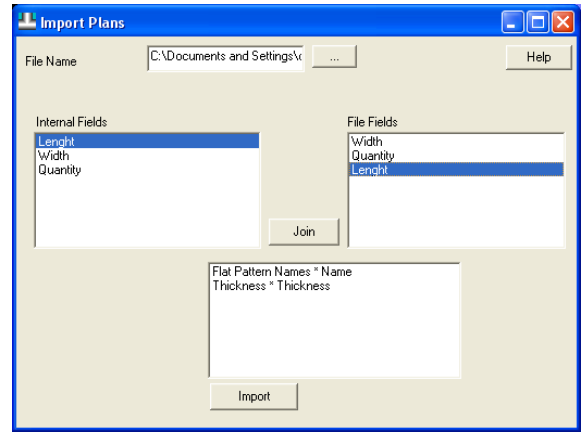



| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | **Name** | **Lenght** | **Width** | **Quantity** | **Thickness** |
| 2 | **Pattern 1** | **200** | **500** | **15** | **1.2** |
| 3 | **Pattern 2** | **350** | **550** | **10** | **1.2** |
| 4 | **Pattern 3** | **100** | **200** | **10** | **1.2** |
| 5 | | | | | |
| 6 | | | | | |



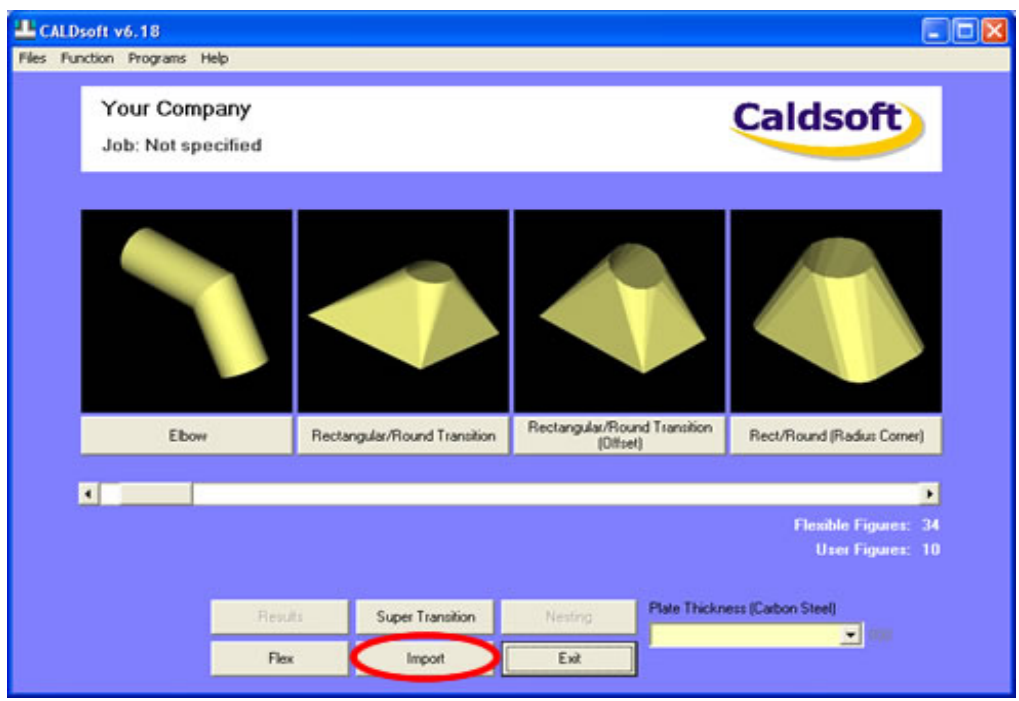

Then, in CALDsoft go to Functions/Import/Import rectangular flat pattern. On the screen that will open (import planes) you will have to select the file separated by tabs and then relate the intern fields (of the system) with the external fields (the file).



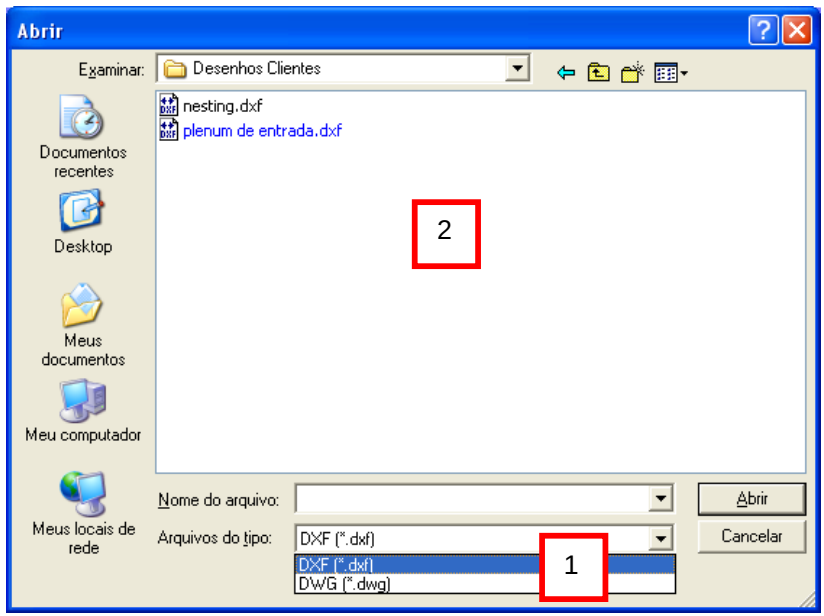




- **Importing flat patterns of DXF/DWG files:**

The CALDsoft import DXF/DWG files of the versions of AutoCAD 2000 or previous.
To import a flat pattern save in a file, just click on “Import” button.



After clicked on import will open the screen where you choose the kind of file (DXF or DWG) and where you select the file to be imported, that are showed respectively for the numbers 1 and 2 on figure below.




After chose the kind of file and the file to open, just click on **Open** button.

Now the software will ask in sequence: the thickness, the code of the piece and the quantity (quantity of flat pattern that you wish to work). These are the obligators fields and are filled in all caculation done on CALDsoft.

After filled these fields the CALDsoft will ask if you “Do you wish to inform all fields”, that is, it will ask if you want to inform the optional fields or not. If yes, it will be requested to inform these fields.

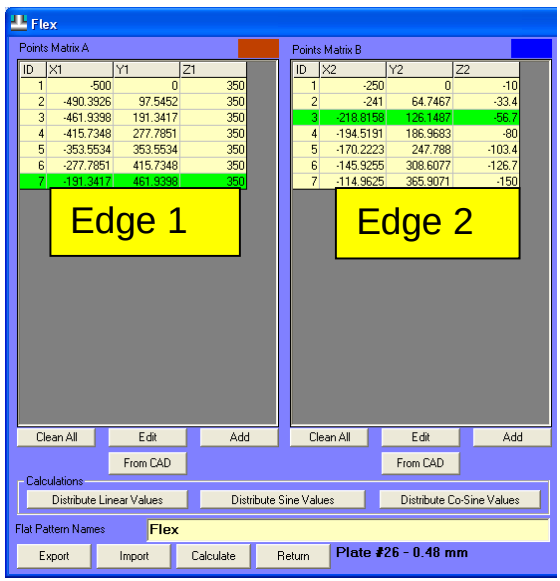
Concluded these steps you flat pattern was imported. Just click on “Results” button and you will see you file being part of the calculations of current job.

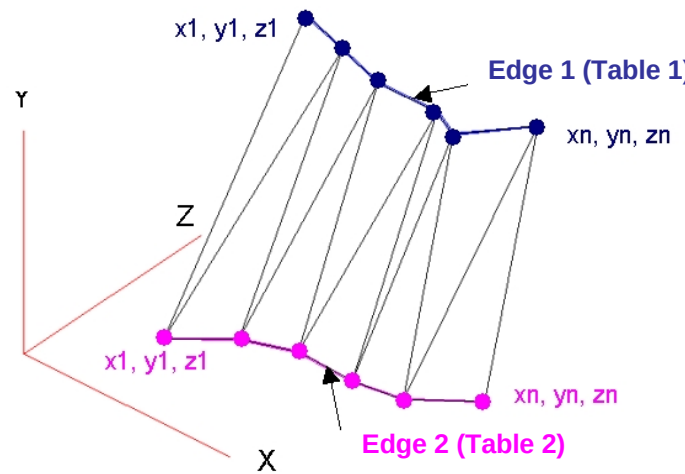
**IMPORTANT**: CALDsoft only import lines (LINE), arcs (ARC) and circles (CIRCLE) entities. All others entities are ignored.

**NOTE**: use the Purg command to clean your files before to import by CALDsoft.

With this tool the CALDsoft can unfold any transition. To do this, the coordinates X, Y and Z of the 2 edges must be informed in the Flex tables. The tool Flex is also useful to unfold any project done in AutoCAD, it is only needed to select the points of the 2 faces and the CALDsoft will calculate then.

This allows any transition to be unfolding by the CALDsoft, making the possibilities to unfold infinite.



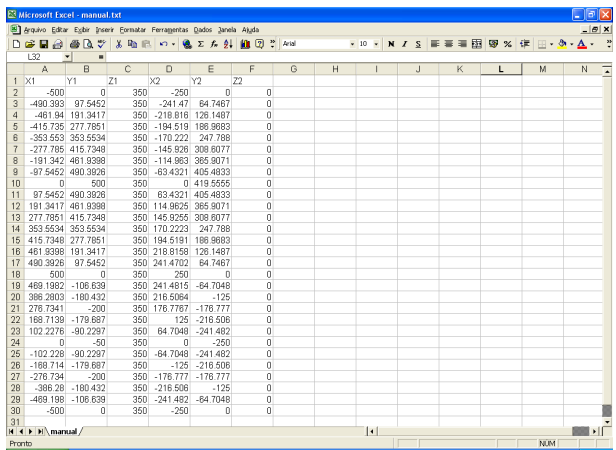

To calculate a transition, just fill out the 2 tables with X, Y and Z coordinates of the edges. The number of points of the 2 edges must be always equal.

We can save clicking in “Export” or load clicking in “Import”. When we export the points from Flex the CALDsoft will save the coordinates of the points as a separated by tabs .txt file

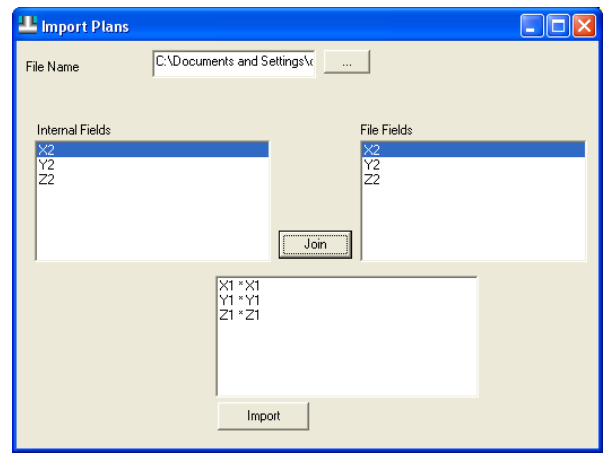
There are two easier ways to fill out the tables 1 and 2 of Flex. One is importing the coordinates from any electronic plan sheet (Excel is great for this purpose) and another is using the lisp routine inside the AutoCAD, which will facilitate this process.

§ **Importing coordinates from an electronic plan sheet:**

First input the column data (X1, Y1, Z1, X2, Y2, and Z2) then fill out the columns with the coordinates of the points as the table below:




| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | X1 | Y1 | Z1 | X2 | Y2 | Z2 |
| 2 | -500 | 0 | 350 | -250 | 0 | 0 |
| 3 | -490.393 | 97.5452 | 350 | -241.47 | 64.7467 | 0 |
| 4 | -461.94 | 191.3417 | 350 | -218.816 | 126.1487 | 0 |
| 5 | -415.735 | 277.7851 | 350 | -194.519 | 186.9683 | 0 |
| 6 | -353.553 | 353.5534 | 350 | -170.222 | 247.788 | 0 |
| 7 | -277.785 | 415.7348 | 350 | -145.926 | 308.6077 | 0 |
| 8 | -191.342 | 461.9398 | 350 | -114.963 | 365.9071 | 0 |
| 9 | -97.5452 | 490.3926 | 350 | -83.4321 | 405.4833 | 0 |
| 10 | 0 | 500 | 350 | 0 | 419.5555 | 0 |
| 11 | 97.5452 | 490.3926 | 350 | 83.4321 | 405.4833 | 0 |
| 12 | 191.3417 | 461.9398 | 350 | 114.9625 | 365.9071 | 0 |
| 13 | 277.7851 | 415.7348 | 350 | 145.9255 | 308.6077 | 0 |
| 14 | 353.5534 | 353.5534 | 350 | 170.2223 | 247.788 | 0 |
| 15 | 415.7348 | 277.7851 | 350 | 194.5191 | 186.9683 | 0 |
| 16 | 461.9398 | 191.3417 | 350 | 218.8158 | 126.1487 | 0 |
| 17 | 490.3926 | 97.5452 | 350 | 241.4702 | 64.7467 | 0 |
| 18 | 500 | 0 | 350 | 250 | 0 | 0 |
| 19 | 469.1982 | -106.639 | 350 | 241.4815 | -64.7048 | 0 |
| 20 | 386.2803 | -180.432 | 350 | 216.5064 | -125 | 0 |
| 21 | 276.7341 | -200 | 350 | 176.7767 | -176.777 | 0 |
| 22 | 168.7139 | -179.687 | 350 | 125 | -216.506 | 0 |
| 23 | 102.2276 | -90.2297 | 350 | 64.7048 | -241.482 | 0 |
| 24 | 0 | -50 | 350 | 0 | -250 | 0 |
| 25 | -102.228 | -90.2297 | 350 | -64.7048 | -241.482 | 0 |
| 26 | -168.714 | -179.687 | 350 | -125 | -216.506 | 0 |
| 27 | -276.734 | -200 | 350 | -176.777 | -176.777 | 0 |
| 28 | -386.28 | -180.432 | 350 | -216.506 | -125 | 0 |
| 29 | -469.198 | -106.639 | 350 | -241.482 | -64.7048 | 0 |
| 30 | -500 | 0 | 350 | -250 | 0 | 0 |
| 31 | | | | | | |

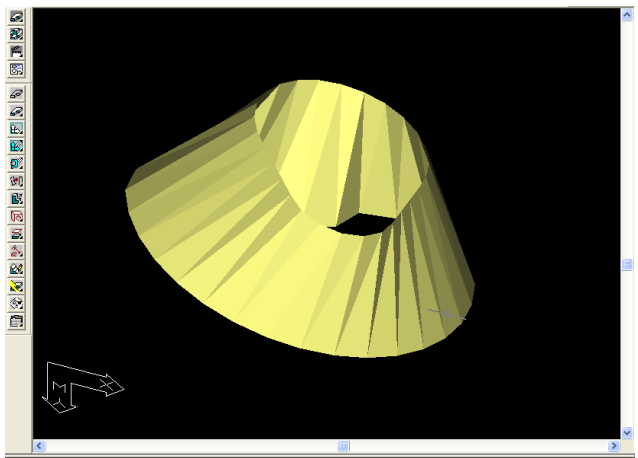



Now just save the coordinates as “Separated by tabs” and load in “Import” inside the Flex tool and then relate the columns like the way desired.

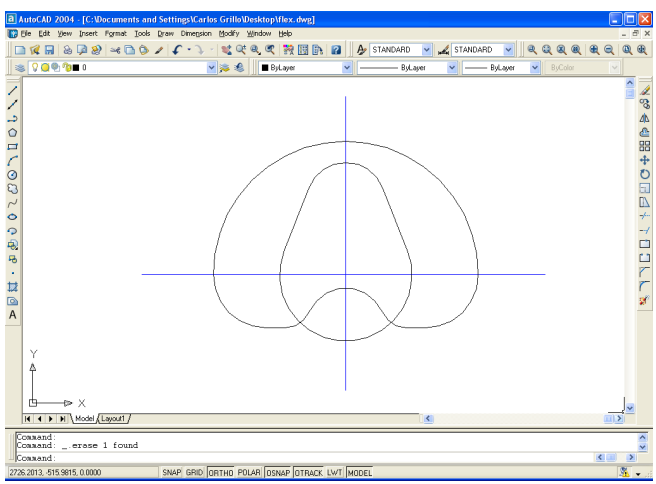
§ **Importing coordinates from AutoCAD with lisp routine:**

To show this function we will use in example:

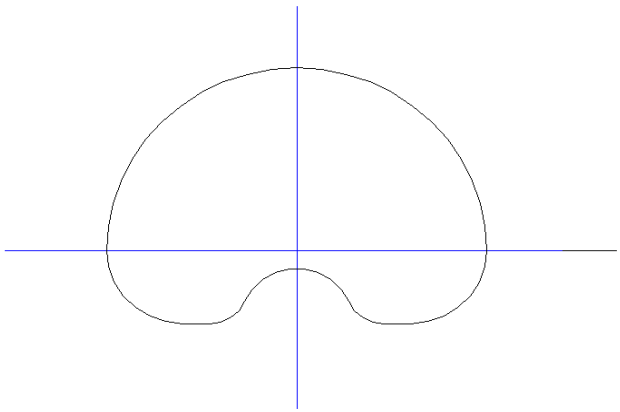
Let's supose that a transition as the picture below will be made.



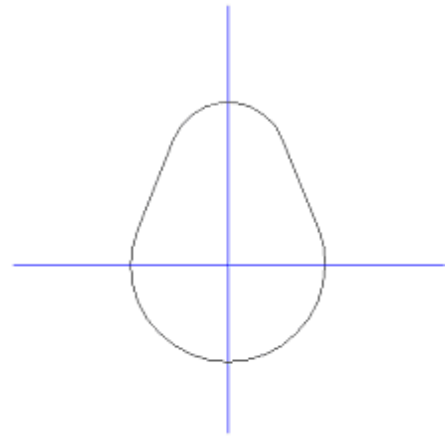
The two openings were draw in 2D in AutoCAD as the picture below.


AutoCAD 2004 - [C:\Documents and Settings\Carlos Grillo\Desktop\flex.dwg]
Command:
Command: _ erase 1 found
Command:
2726.2013, 515.9815, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK LWT MODEL

First let's draw the points of the picture that will be the reference for the CALDsoft will need to be able to read later (do not forget that the drawing line must be the neutral line of the material). In Taisei illustration we have two drawings:

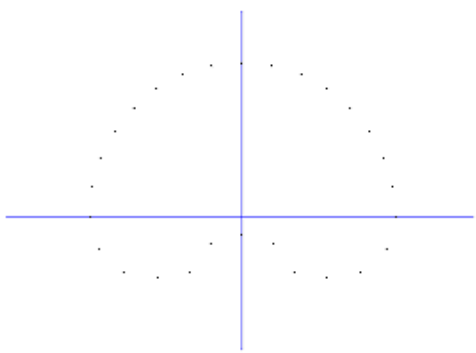


Picture 1

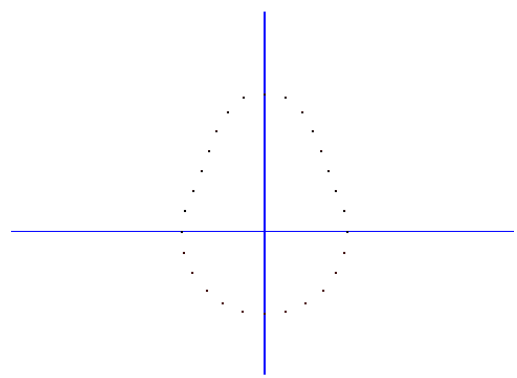


Picture 2

Divide the drawings in any way (it can be any, as long as there is the same number of divisions on both). AutoCAD a good way to divide is using the command "divide", this will divide the drawing.



Picture 1

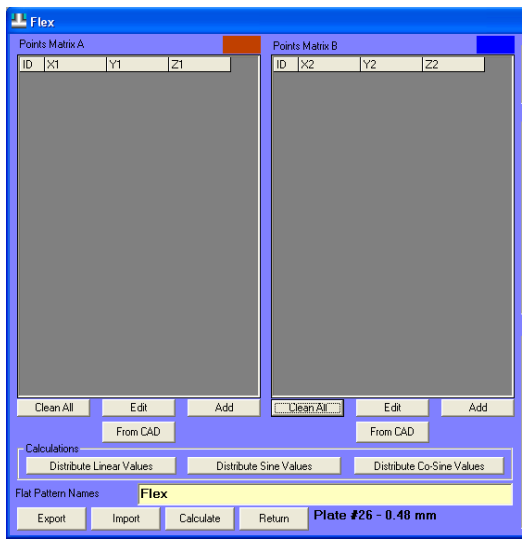


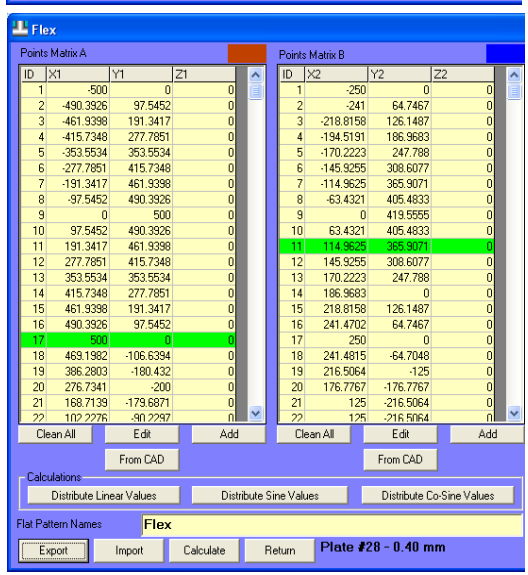
Picture 2

Now we load the transfer lisp routine of the points to the CALDsoft (save_points.lsp), to do this, just type in AutoCAD "appload" and then select the file "save_points.lsp" in the CALDsoft folder. This routine is used to select the points that we will load to CALDsoft.

To start this routine in AutoCAD type "(h)" and then proceed clicking the points and pressing ENTER to continue or ESC to interrupt.

We can not forget that the selection must follow a pattern, for instance, the point 1 of the picture 1 has to coincide with the point 1 of the picture 2 and the “User Coordinate System” (UCS) must be the center of the of the two pictures. After selecting all the points of the first picture click ESC, go then to CALDsoft and then to Flex.




On this screen, just click on “From CAD”, the button below table A.

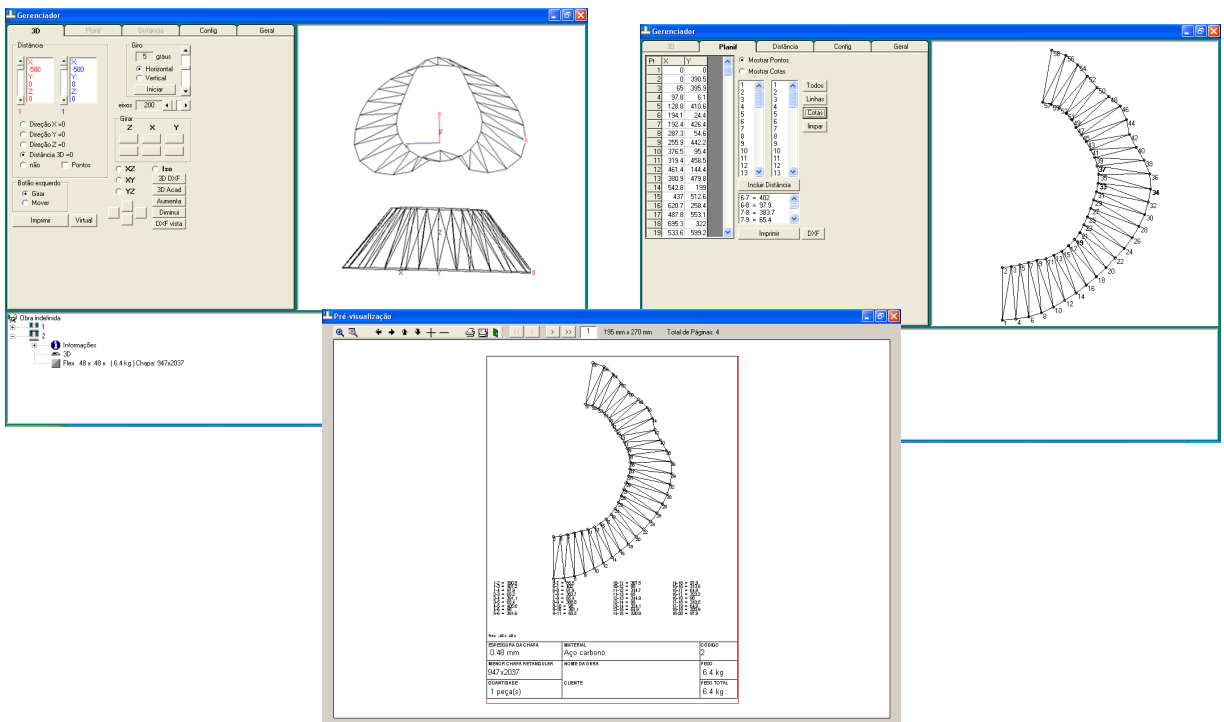
After doing this, just select all the points in picture 2, never forgetting to change the UCS to the center of the picture (UCS command), and do the same process, filling out table B.

Now one of the columns must be altered to the distance Z desired. We will place the picture 2 with 300 mm from the picture 1. To do this, just click the point 1 of the picture 2 and then “Edit”, altering the Z from 0 to 300 and then again in “Edit”.

Repeat the same process on the final point of the same picture and then click “Distribute linear values” selecting in column Z the point 1 as starting point and the last point as the final point (doing this the CALDsoft will make a progression from the first until the last value, and as both are equal all the values in column Z will be 300). The project could be also draw already in 3D in AutoCAD, this way the points extracted to the CALDsoft would already be with all the coordinates (X, Y and Z) correct.

Now that all the points are defined, the flat pattern will be processed in “Calculate” and then in “Results”.

We will then have a piece like any other calculated by the CALDsoft, with 3D, dimensions, distances and printing.



## WARRANTY TERM

The formal warranty about our product is shown as it follows:

1. Global warranty on logic programming problems (Bugs), in operations/functions available at the given version;
Due date: Three (3) months warranty.

2. Hardlock repositional warranty, when accidental damage, with the return of the damaged hardlock by the client, and reposition from the costs of the circuit at the required date.
The Hardlock is the license to the use of its program, in case of loss, damages or misplacing, the license will be canceled, that is, CALDsoft6 will not take the blame for such damages.
Due date: Three (3) months warranty.

3. Support warranty about the software functionalities only when the “User’s manual” was not understood.
Due date: Three (3) months warranty.

### Important Considerations

The calculations developed by software CALDsoft6 are made up from the analytical geometry, using the classic methods of sheet metal unfolding, considering the value II (pi) as 3.1416 and the average perimeter as a regular basis. Some companies use alternative methods of sheet metal unfolding (at least approximately), however, we suggest the battle between the plan presented by CALDsoft6 and the traditionally used in the company (for the first parts calculated), in order to evaluate the differences that can exist among the methods.